VARIATIONS IN THE COSTS OF CARING FOR CHILDREN IN OUT-OF-HOME CARE

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ABSTRACT

Chung-Kwon Lee: Variations in the costs of caring for children in out-of-home care

(Under the direction of Dean F. Duncan, III, PhD)

The living arrangements and services that local child welfare agencies provide for foster children vary because of differences among the characteristics and needs of foster children, the demographic and socio-economic conditions of the counties in which the agencies are located, as well as any number of local, county, and state policies and practices. These differences in contextual factors contribute to differences in the experiences of and payments for children in foster care. In light of these large and complex variations, this study examined how child- and county-level factors are related to variations in costs of caring for children in out-of-home care.

Using longitudinal administrative data for 32,978 children in North Carolina who entered foster care for the first time between July 2000 and June 2006, this study employed a multilevel analytical approach to assess how individual costs for children in out-of-home care vary depending on child- and county-level factors and cross-level interactions. Separate analyses were conducted using two multilevel models: 1) a hierarchical generalized linear model (HGLM) for the full sample (N=32,978) to examine the likelihood of foster care costs, and 2) a hierarchical linear model (HLM) for children who had foster care costs (n=23,519) to assess the average monthly costs.

The study found that multiple child-level factors (e.g., the child's demographic

characteristics, reason for placement in out-of-home care, foster care experiences, and reason for exit from care) and county-level factors (e.g., county characteristics, local agency practices) were associated with the likelihood and/or amount of foster care costs. Several child-level factors influenced costs differently, depending on county-level factors.

Detailed, multilevel assessment of variations in foster care costs can help determine whether an intervention is a good use of resources to meet the needs of foster children and produce positive outcomes. It is hoped that study results will inform service practices and shape policy to improve experiences and outcomes for children in the child welfare system.

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CHAPTER 1

INTRODUCTION AND BACKGROUND

Introduction

In the best of all possible worlds, children would live with their biological parents in a safe nurturing home environment until they become self-sufficient adults. Unfortunately, this is not a reality for children who are placed at risk or harmed by their biological caretakers and subsequently placed into out-of-home care. While some foster children are able to be reunified with their families, others cannot return home. Those who cannot return home may eventually be adopted or moved into another permanent placement, but some are not and instead age out of child welfare services, run away, or exit foster care for other reasons (Bess, Leos-Urbel, & Geen, 2001). Also, research reveals that many foster children experience difficulties in transitioning to adulthood, finding high rates of homelessness, non-marital childbearing, poverty, and criminal behavior (Barth, 1990; Cook, 1990; Courtney & Piliavin, 1995; McMillen & Tucker, 1999).

One of the major activities of child welfare services and programs is to care for children who have been removed from the care of their biological parents due to abuse and/or neglect (Dore, 1999; Leslie, Hurlburt, et al., 2003). Child welfare agencies have implemented practices to help ensure that these children have a safe and stable living environment (Barth, Courtney, Berrick, & Albert, 1994). To ensure children's needs are met and achieve positive outcomes in out-of-home care services, policymakers,

practitioners, and researchers have made efforts to develop valid and reliable methodologies to assess the outcomes of the children, families, and communities served by the child welfare system. Most studies on children in out-of-home care have focused on effects or outcomes. Previous research has used federal permanency planning mandates and key variables including permanency, length of time in care, and placement stability as measures of outcomes (Glisson, Bailey, & Post, 2000; Inkelas & Halfon, 1997; McMurtry & Lie, 1992; Weigensberg, 2009). These investigations have been informative in helping to better understand differing aspects of out-of-home care.

In addition to a continued emphasis on foster care outcomes, policymakers and program managers are increasingly demanding information on costs of caring for children in the child welfare system in order to examine the success of child welfare services (Barth, Lee, Wildfire, & Guo, 2006). For example, the North Carolina Division of Social Services (NC-DSS) manages a database for its out-of-home care placement and payment system, in order to collect information on expenditures for programs and services for all foster children in North Carolina and to provide data for the purpose of measuring program performance. Although the state has standard board rates, payments for foster children may vary from county to county and by their individual needs and experiences in out-of-home care. In other words, the living arrangements and services that local child welfare agencies provide for foster children vary because of differences among the characteristics and needs of foster children, the socio-economic conditions of the counties in which the agencies are located, as well as any number of local, county, and statewide policies and practices. These differences in contextual factors contribute to differences in the experiences of and payments for children in foster care system.

In light of these large and complex variations, a sophisticated assessment of costs is needed. This assessment must go beyond simple tabular comparisons of treatment costs; instead we need a comprehensive consideration of the relationship between foster children's needs, the costs of the services they receive, and state and county agencies' aggregate characteristics and performances. It is critical to assess the worthiness of services and programs in a financial sense, especially when these resources are limited (Knapp, 1995). To this end, the purpose of this paper is to better understand how individual- and macro-level factors are related to variations in costs of caring for children in out-of-home care. This study tries to identify which child and county factors affect foster care costs, using longitudinal data with multilevel modeling to account for the nested nature of children grouped within county child welfare agencies. It is hoped that this focused study will help practitioners and policymakers to assess whether an intervention is a good use of resources to meet the needs of vulnerable children in out-of-home care and produce positive outcomes, and simultaneously to satisfy local policies and politics.

The Current State of Foster Care

Foster care is a service of the child welfare system designed to provide out-of-home care to children who are considered in imminent danger of abuse or neglect if they remain in the care and custody of their biological family (Curtis, 1999). A number of factors may precipitate a child's removal, including exposure to severe psychosocial stressors such as abuse and neglect, extreme poverty, homelessness, and parental substance abuse (Rosenfeld et al., 1997). At any given time, about a half-million children in the United States are living in out-of-home care as a result of abuse or neglect they

have experienced. The federal Adoption and Foster Care Analysis and Reporting System reported that about 423,800 children were in foster care in September 2009 (U.S. Department of Health and Human Services [USDHHS], 2010). Nearly 4 in 10 (37.5%) of these children were ages 13 and older, 35.2% were 5 years old or younger, and the other 27.3% were ages 6 to 12. In that same year, 255,400 children entered the foster care system and 276,300 exited foster care (USDHHS, 2010).

African American children are over-represented in the foster care system (Roberts, 2002). Whereas 15.1% of the U.S. child population is African American, Black non-Hispanic children comprise 25.4% of the foster care population, making them the second largest race/ethnicity group in foster care, behind only White non-Hispanic children (43.6%) (USDHHS, 2010; U.S. Census Bureau, 2010). African American children also stay in foster care longer: In 2006, African American children stayed in out-of-home care about 9 months longer than White children (GAO, 2008). The overrepresentation of children of color is most apparent in large cities where there are high racial/ethnic minority populations (W.K. Kellogg Foundation, 1997).

Children placed in out-of-home care experience a variety of problems, including increased health problems, mental health issues, developmental issues, inadequate educational support, and increased behavioral problems. Children in out-of-home care are at a greater risk for health problems than the general population (Chernoff, 1994). One study indicates that many of these children have multiple health conditions, which compounds the need for proper medical care (Leslie, Kelleher, Burns, Landsverk, & Rolls, 2003). Some of the most prevalent health conditions among foster children include infections, asthma, blood disorders, vision problems, hearing problems, drug exposure,

and even sexually transmitted diseases (Chernoff, 1994; Crosson-Tower, 2001; Dale, Kendall, & Schultz, 1999; Leslie, Hurlburt, et al., 2003).

Many children in placement also experience multiple mental health issues that compound their physical problems. When children experience a failure in their family situation (e.g., neglect, abuse, abandonment) and subsequent changes in their environment (i.e., being placed in out-of-home care), it places them at a greater risk for psychopathology (Price & Landsverk, 1998). As a result, children in out-of-home placements experience a greater prevalence of mental health conditions than the general population (Cohen, Brown, & Smailes, 2001; Harman, Childs, & Kelleher, 2000; Leslie et al., 2000). Research suggests that between 30% and 60% of children who enter out-of-home care exhibit some form of mental disorder (Dore, 1999), including depression, ADHD, anxiety disorder, and other externalizing and internalizing problems (Bolger & Patterson, 2001; Harman et al., 2000; Karnik, 2001).

Developmental problems are also a significant issue for children in placement. Between 20% and 61% of young children in out-of-home care are estimated to have a developmental delay or disability (Leslie, Hurlburt, et al., 2003; Szilagyi, 1998) compared with a prevalence of only 10% in the general population (First & Palfrey, 1994). Some of this disparity may be due to higher rates of abuse among children with disabilities (Sullivan & Knutson, 2000). Some of the more common problems among younger children in out-of-home care include prematurity, mental retardation, developmental delays, and learning disabilities (Leslie, Hurlburt, et al., 2003). In older children there is a greater prevalence of learning and educational disorders; between 40% and 50% of school-aged foster children are eligible for special education programs

(Szilagyi, 1998). One explanation for these higher prevalence rates may be that during infancy and/or toddlerhood, neural connections in brain development are negatively impacted by environmental conditions, including abuse, family violence, or lack of stimulation (Greenough, Black, & Wallace, 1987).

Problems brought about by abuse or neglect can have a significant impact on a child's ability to learn (Colton & Heath, 1994). Children in out-of-home care demonstrate lower performance and achievement in school than the overall school population based on a variety of measurements (Altshuler, 1997; Jackson, 1994). Zetlin, Weinburg, and Kimm (2003) found that 40% of children in placement experienced some type of school-related problem based on school records. Moreover, children in out-of-home care often perform below grade level in multiple subject areas (Ayasse, 1995; Casey Family Program, 1998) and have higher rates of special education needs than the general school population (Iglehart, 1995; Smucker & Kauffman, 1996). High school dropout rates are also higher for children in out-of-home care (Casey Family Program, 2003; Martin & Jackson, 2002). A follow-up study of adolescents who aged out of foster care concluded that they had less education and were more likely than their peers who were not in foster care to be dealing with homelessness, substance abuse, and criminal activity (Barth, 1990).

Children in out-of-home care exhibit a variety of behavioral disorders. Rates of behavioral disorders are higher for children in placement than for other children, even those living in poverty (Heflinger, Simpkins, & Combs-Orme, 2000; Leslie, Hurlburt, et al., 2003). Externalizing disorders are the most common and include disruptive behavior disorders such as attention deficit hyperactivity disorder, conduct disorder, and

oppositional defiant disorder (Casey Family Program, 2003; Szilagyi, 1998; Wodarski, Kurtz, Gaudin, & Howing, 1990). Children in placement also have high rates of social problems, anxiety, and depression (Casey Family Program, 1998; Romansky, Lyons, Lehner, & West, 2003).

The public child welfare system has offered four primary types of out-of-home care placements to reduce these complex problems and meet children's needs: (a) foster family care, (b) kinship care, (c) institutional care,[1] and (d) group home care (Brooks & Webster, 1999). Children living in foster family care live with an unrelated family who has been licensed to care for them (Kelly, 2000). Foster families serve approximately 47.6% of all children in out-of-home placements (USDHHS, 2010). Kinship care places children in the family home of adult relatives or friends who have been assessed for safety and may or may not be licensed (Gleeson, 1999). Kinship caregivers serve about 24.2% of all children in out-of-home placement (USDHHS, 2010). A child who is removed from a birth family can also be placed in an institutional setting (9.6%) or a group home (6.0%), where employees work with children in a structured setting (Kelly, 2000; USDHHS, 2010).[2]

While child safety is well known to be a primary concern in public child welfare service delivery, permanency for children is also a vital issue and a primary goal for public child welfare services. Child welfare research has focused on the following

[1] Brooks and Webster (1999) used the term "foster family agency care" instead of institutional care. Foster family agency homes, which are usually classified as institutional care, are certified to operate under nonprofit foster family agencies that provide professional support. Group homes are facilities of any capacity that provide 24-hour services and supervision, as well as non-medical care, to children. Foster family agency cares are sometimes required by law to serve as an alternative to group home placements.

[2] According to the AFCARS report (USDHHS, 2010), there are other types of placement settings in foster care: pre-adoptive home (4.1%), supervised independent living (1.1%), trial home visit (5.5%), and runaway (1.9%).

outcome domains of permanency: placement stability, length of stay, achievement of permanency (e.g., reunification/adoption), and reentry into foster care. Most children placed in out-of-home care experience at least one placement change during their time in care (Usher, Randolph, & Gogan, 1999). Most placement changes occur within the first six months in out-of-home care (Staff & Fein, 1995; Wulczyn, Kogan, & Harden, 2003). Placement stability is particularly critical for children who remain in care for long periods. In comparison to the overall population of children in care, for whom one or two placements is the norm, over half of children who remain in foster care until emancipation have three or more placements—that is, they change placements two or more times (Needell, Cucarro-Alamin, Brookhart, Jackman, & Shlonsky, 2002).[3]

In September 2009, the mean length of stay for children in out-of-home care was 26.7 months, and the median length of stay was 15.4 months. Approximately 17.2% of children who left care in fiscal year 2009 had been in care three years or more (USDHHS, 2010). Longitudinal studies show that length of stay varies by child age, reason for exit from foster care, ethnicity, and placement type (e.g., kin or non-kin) (Courtney & Wong, 1996; Wells & Guo, 1999; Wulcyzn, 2003). Studies examining length of stay typically include demographic variables (e.g., the child's age, gender, race/ethnicity) and child-specific characteristics (e.g., removal reasons, placement type, family structure and socioeconomic status of the child's family of origin) as variables in the analyses (Connell, Katz, Saunders, & Tebes, 2006; Glisson et al., 2000).

Studies about rates and likelihood of reunification for children in out-of-home care show that between 32.0% and 49.2% of foster children exit out-of-home care to

[3] Needell et al. (2002) defined emancipated children as children who exited the foster care system with a reason for termination code of "emancipation or age of majority" or who exited at age 19 or older with no termination reason given.

reunification with parents (Hines, Lee, Osterling, & Drabble, 2007; USDHHS, 2010; Wells & Guo, 1999). Approximately one fourth of the children in foster care in September 2009 were later adopted, while 25.8% of these children did not have the goal of reunification with parents or adoption (USDHHS, 2010). Following reunification, if parents do not sustain changes required to ensure a healthy environment for the child and family members, the child may re-enter the foster care system. Among children who were reunified with birth families within two years of removal, 15.8% reentered out-of-home care within one year of returning home (Wells & Guo, 1999).

Statement of Problem

Since the implementation of the Adoption Assistance and Child Welfare Act (1980), there has been a concentrated effort to improve child welfare practice by setting guidelines for case planning and implementation of services and programs for children and families involved with the child welfare system (Pecora, Whittacker, Maluccio, Barth, & Plotnick, 2000). Among child welfare service components, out-of-home care is an area of serious concern within the social work profession (Ashby, 1997; Casey Family Program, 2003; Epstein, 1999). Out-of-home care is defined as the provision of all aspects of care for the physical and psychological needs of a child who must remain outside of their home for more than 24 hours, generally due to extreme circumstances of parental deficiency (Kadushin & Martin, 1988).

The majority of out-of-home care costs are for foster care payments and child welfare services. Specifically, funds are mainly available for maintenance payments for foster children for daily care and specialized services if needed, and administrative costs to manage foster care programs, including social worker salaries and funds for training of

staff and foster care providers. Federal funds make up over half of all money spent on child welfare services. Financing comes through a variety of separate programs, with Titles IV-B and IV-E of the Social Security Act being the primary sources of funding specifically allocated for child welfare services (U.S. House of Representatives, 2004). While Title IV-B focuses on funding for services to promote safe and stable families, Title IV-E funds are dedicated primarily to costs associated with out-of-home care and adoption. Over $22 billion is spent each year on child welfare services, more than half of which is spent on out-of-home care (U.S. House of Representatives, 2004).

In terms of funding structure, the foster care system in most states is made up of three separate programs with different funding sources: federal, state and county. The federal foster care program is an open-ended entitlement program. Most foster children are federally eligible and receive federal funding; these children also meet specific income/eligibility criteria for programs such as Medicaid or Temporary Assistance to Needy Families (TANF) (U.S. House of Representatives, 2004). Each state is reimbursed for about half of the costs of maintenance and administration for all federally eligible children (Foster, 2001); the state and county share the remaining costs (Bess, Andrews, Jantz, Russell, & Geen, 2002).

Critics have long argued that there are problems with the lack of fiscal flexibility in the existing funding structure. With a cap on federal funds for prevention and an open-ended entitlement on placement expenses, these researchers argue, states have little financial incentive to emphasize the child welfare goals of keeping families together and ensuring timely permanency of children removed from their homes (Courtney 1998; Wulczyn, 2000). To overcome the weaknesses of the federal financing structure for child

welfare services, a number of proposals have been made in recent years. Under the Omnibus Budget Reconciliation Act of 1993, Public Law 103-66, the federal government provided additional financial resources to states for development, implementation, and evaluation of family preservation and other support services (Barber & Delfabbro, 2004). The Personal Responsibility and Work Opportunity Reconciliation Act of 1996 (PRWORA) authorized the Department of Health and Human Services to grant waivers to states to experiment with some of their Title IV-E funds as a type of block grant (Capizzano & Stagner, 2005; Geen, Boots, & Tumlin, 1999).

More recently, the Adoption and Safe Families Act (ASFA), enacted in 1997, gave child welfare agencies and the courts the power to move forward more quickly with permanency planning for children in out-of-home care (Webb & Harden, 2003). It further identified a national set of outcome measures that can be used to gauge state and national progress in reaching the goals of child safety, permanency, and well-being for children and families (Lehman, Liang, & O'Dell, 2005). Beginning in 2000, child welfare outcomes have been federally monitored through the Child and Family Services Review (CFSR) process (Milner, Mitchell, & Hornsby, 2001). In addition to the legislation emphasizing outcomes, the federal government has approved waivers of Title IV-E funding limitations in several states (Foster & Holden, 2002).

Under these waiver demonstration programs, child welfare agencies have been forced to increase their emphasis on more strategic allocation of funding for child welfare services (Bess et al., 2002). In addition to meeting the two primary objectives of reducing the number of children in public care and their length of stay, the states receiving the Title IV-E waiver are required to remain cost-neutral in implementing new programming. Cost

neutrality requires that federal expenditures be no higher under the demonstration than they would have been had the waiver not been granted (Foster & Holden, 2002; U.S. House of Representatives, 2004). Thus, states and counties in the Title IV-E waiver are required to develop strategies for both ensuring permanency for foster children and reducing the rate of growth in maintenance and administrative costs of placement in out-of-home care.

Evaluations in several states have shown achievement of cost neutrality as well as a reduction of entry and reentry into foster care. According to Bess et al. (2002), a number of evaluations of IV-E waiver demonstration projects have shown significant reductions in out-of-home placements. In Indiana, for example, organizations were able to prevent placement for more than 45% of the children in their experimental group (i.e., the group that had access to the waiver) compared to only 38% in the control group, while in Oregon, children in the waiver group were placed at one third of the rate of children in the control group (Piccola, 2006).

Results of the IV-E waiver demonstration project in North Carolina, which was one of the first states in the waiver demonstration, have been mixed. The North Carolina waiver demonstration focused on the flexible use of funds. The goals of the project were to reduce entries into licensed care, reduce the length of time in care, and reduce returns to care. As with all the waivers, this one was required to be cost neutral. Cost neutrality was determined by comparing the Title IV-E expenditures for program administration, covering such things as the costs of social workers, as well as maintenance costs for children in licensed care. During the first phase of the waiver, which began in July 1997 and ended in June 2002, cost neutrality was maintained. One reason for this was that the

number of children in licensed care in waiver counties decreased from 1,475 in June 1997 to 1,097 in June 2001, compared to minimal changes for children in comparison counties. With the reduction of the number of children in out-of-home care during the first phase of the waiver, the federal reimbursement for the Title IV-E maintenance costs in waiver counties declined (Usher et al., 2002). Administrative costs among the group of comparison counties rose at a faster rate than in waiver counties during the same period.

The cost savings due to the waiver allowed counties to use dollars which might have been spent on maintenance and administrative costs on such things as prevention services, which reduced the number of children entering care, as well as on services and other items, such as home repairs, which allowed children to exit foster care. Some counties involved with the waiver demonstration implemented an assisted guardianship program which provided payments to guardians and allowed children to exit foster care to a permanent setting.

The Children's Bureau allowed the state to continue the waiver for a second five-year period. That demonstration was not as successful. The number of counties involved in the waiver demonstration nearly doubled and included most of the large and mid-sized counties in the state. A number of these counties were interested in participating in the waiver so that they could offer assisted guardianship. However, even though a county may have wanted only to offer assisted guardianship, calculations of cost neutrality were based on all Title IV-E fund expenditures for counties involved in the demonstration, not just expenditures for assisted guardianship. For this and a number of other reasons, maintenance costs for the demonstration counties during the second phase of the waiver grew at a higher rate than costs for the comparison counties. As the demonstration began

to lose cost neutrality, the state decided end the effort early in order to avoid any financial penalties (Wildfire et al., 2008).

These mixed results suggest that the current federal child welfare financing structure may make it difficult for states and counties to design service interventions that account for variations in agencies' policies and practices as well as foster children's individual needs (Bass, Shields, & Behrman, 2004; Bess et al., 2002). These results also call for a more nuanced approach than the current one-size-fits-all approach. Needed instead is an in-depth longitudinal cost study at the individual level which reflects the needs of children in out-of-home care and their experiences as well as local agencies' policies and practices.

To do this, the research must begin with good longitudinal data which includes the characteristics of the children in care, the county in which each child is living, and the policies and practices within each local child welfare agency. Next, it must employ an appropriate analytical method. In particular, a multilevel perspective is needed, because children (individual level) are served by local child welfare agencies (agency level), and their placements and costs are mainly affected by agencies' policies and practices. To examine costs only on the individual level would ignore important agency-level factors that influence costs. Likewise, to examine costs only on the agency level would ignore important individual-level factors that influence costs. Examining costs through a multilevel perspective, though, would provide a more complete and accurate picture of what factors among children and county agencies may influence costs for placements and service use in a contextual framework. This research would help state and county child welfare agencies to estimate a baseline cost for effectively providing services to their

population, and to target needed improvement efforts.

Significance of Study

Given that there are so many variations in care for foster children by type and duration of placements, it would follow that there are many variations in the costs of this care. These cost variations are due to foster children's individual characteristics and experiences in the child welfare system, local agencies' policies and practices, as well as the characteristics of counties. There are four general requisites to be considered in estimating costs of out-of-home care at the individual level (Knapp, 1993, 1995): 1) socio-demographic variables, including the child's age at entry and exit, race/ethnicity, and socioeconomic status of the birth family; 2) previous history, including the reason for initial referral and placement into care and the child's specific problems; 3) service-related factors, including the type, restrictiveness, duration, and number of placements and programs provided by local agencies, and 4) outcomes, encompassing total length of stay in out-of-home care, permanency, and probability of reentry.

To fully consider the principles and the methods mentioned above, it is necessary to account for both individual- and county-level factors which may affect costs in out-of-home care. In other words, by understanding how foster care costs are related to characteristics of counties, policies and practices of local agencies, as well as individual characteristics and experiences of foster children, the study can provide policymakers and managers of child welfare agencies with valuable data to guide policy and program development. In particular, if certain child- and local-level factors significantly affect costs for children, such information must be carefully reviewed to assess whether an intervention is an effective use of resources so that agencies can ensure that their services

meet targeted needs, improve child welfare services, and ultimately produce better outcomes for foster children (Rossi, Freeman, & Lipsey, 1999). Furthermore, the study can provide a basis for future research that would analyze costs of child welfare and/or public welfare services with multilevel analytic methods which account for clients nested within local agencies. In other words, looking at micro-level characteristics in conjunction with macro-level factors provides more comprehensive information about what factors in a multilevel context may influence outcomes, and, furthermore, whether the effects of micro-level factors on outcomes vary depending on macro-level factors.

CHAPTER 2

THEORETICAL AND CONCEPTUAL FOUNDATION

Theoretical Framework

The literature on foster care has reflected several different approaches to improving our understanding of how foster care is implemented; why some children stay longer in care compared to others; and what happens to children physically, socially, and emotionally during and after a stay in foster care. Research on children in foster care has occurred at national, state, and local levels and has incorporated both micro- and macro-level perspectives. The micro-level perspective has focused primarily on individuals and families, while the macro-level perspective has focused on the larger social environment and human service organizations.

The micro-level perspective helps to explain individual and/or family behavior associated with why children are removed from their homes. For example, studies have focused on parental behavior such as substance abuse or mental health problems; family system issues that affect entry into and exit from care; and patterns of parent and child visitation, which affects attachment and may ultimately be a factor in determining the length of stay in foster care (Benedict & White, 1991; Davis, Landsverk, Newton, & Ganger, 1996; Glisson et al., 2000).

The macro-level perspective on foster care usage focuses on how human service organizations respond to underlying social structural factors and co-occurring social problems in communities. For example, poverty, parental unemployment, lack of social

and economic opportunities, and lack of resources place children living under these conditions at greater risk of becoming involved in delinquency and/or being maltreated, and, by association, at greater risk of removal from their families (Gottfredson, McNeil, & Gottfredson, 1991; Weissman, Jogerst, & Dawson, 2003; Young & Gately, 1988). Strategies for making changes at the macro level require large-scale intervention aimed at reducing poverty and crime, improving employment opportunities, redeveloping impoverished neighborhoods, and reconnecting families.

To combine the micro- and macro-level perspectives—that is, to understand what happens to children who come in contact with the child welfare system and how child welfare organizations respond to their needs—it is necessary to consider all aspects of the following factors: client characteristics, treatments (including primary work, core processes, and technology), bureaucratic and institutional structures, managerial roles and actions, and environmental factors (Lynn, Heinrich, & Hill, 2001).

This chapter discusses a theoretical framework which draws upon three major theories and perspectives: ecological theory, the environmental perspective, and the organizational perspective. These specific theories are then combined to provide an integrated, comprehensive approach to better understand the complexity of factors involved in out-of-home care, which are highly correlated with foster care placements and costs.

Ecological theory. Ecological theory has provided a conceptual framework for examining the relationship among case factors and the ways the social environment affects family functioning and child well-being. Ecological theory places human development within a wider context in which normative development can be facilitated or

hindered by ecological experiences (Wulczyn, Barth, Yuan, Harden, & Landsverk, 2005). Perhaps the best-known ecological theorist is Urie Bronfenbrenner (1979; 1986), whose ideas have been applied to a number of child and family issues, including child maltreatment (Belsky, 1980, 1993).

In his ecological framework, Bronfenbrenner identified four interconnected systems that influence human development: the microsystem, the mesosystem (mezzo system), the exosystem, and the macrosystem (Bronfenbrenner, 1979, 1986). A microsystem consists of the individual and the various people and groups involved on a daily basis with the individual's environment (Bronfenbrenner & Garbarino, 1985). A core aspect of the microsystem perspective is that it examines the individual's level of functioning, motivation, and intellectual and emotional capacities; the impact of the individual's life experiences; and the qualitative nature of the interactions between individuals and elements of their environment. In the context of family, the microsystem includes the individual's immediate environment, such as his or her biological family or current family type. The potential of the microsystem to make a positive contribution to the individual's development is increased when it provides a sense of belonging.

According to Bronfenbrenner and Garbarino (1985), the mesosystem is the second level of the social environment. It refers to the reciprocal processes between multiple microsystems. The mesosystem encompasses the linkages and processes that occur between two or more settings containing the individual, such as the school and the family, and also helps explain family factors such as family structure and family functioning.

The exosystem is the third level of the social environment (Bronfenbrenner &

Garbarino, 1985). The exosystem encompasses the linkages and processes that occur between two or more settings, at least one of which does not ordinarily contain the developing person (Bronfenbrenner, 1979). Thus, the exosystem is a larger social system of events and relationships and refers to such entities as local government, social policy, supports for the family (Whittaker, Schinke, & Gilchrist, 1986), a parent's workplace or friendship network (Bronfenbrenner, 1979), and the neighborhood (Belsky, 1980).

The fourth and final level is the macrosystem, which consists of the overarching patterns of a given culture or broader social context, such as an ethnic group system, and the broad ideological and institutional patterns of a particular culture (Bronfenbrenner & Garbarino, 1985; Hodge & Anthony, 1988). An important premise of the macrosystem perspective is that an organization must be viewed as an open system; thus, changes that occur within the external or macro environment necessarily affect the internal environment.

While Bronfenbrenner (1979, 1986) developed the ecological perspective for human development, Belsky (1980) developed an ecologically based conceptual framework to explain the etiology of child maltreatment. Using Brofenbrenner's (1979) model, Belsky conceptualized an ecological framework that integrates multiple determinants of child maltreatment with *ontogenetic development*, which refers to the individual factors and characteristics of the developing child. The levels of Belsky's ecological framework are defined as: 1) the individual or ontogenetic level, in which normative biological and social developmental processes occur; 2) the family or microsystem, representing the immediate family setting in which maltreatment occurs and interactions between parents and other caregivers take place; 3) the community or

exosystem, which is the larger social structure in which the family is embedded and includes an array of risks for maltreatment; and 4) society or the macrosystem, referring to the cultural patterns and ideologies that shape the exosystem (Belsky, 1980). According to Belsky (1993), multiple factors and their interactions with one another contribute to child maltreatment. In light of this, it can be logically concluded that the interactions of multiple factors also influence out-of-home care. These multiple factors include financial stress, unemployment, familial relations, educational institutions, and policies that may influence parenting (Culhane et al., 2003; Shonkoff & Phillips, 2000).

Ecological theory and foster children. To deliver effective services to children in out-of-home care, accountability for specific performance standards and time frames for service provision is essential to increase and maintain children's safety, well-being, and permanency at every level of service (Blome & Steib, 2007). Ecological theory is a widely used theoretical perspective that emphasizes the conceptualization of children's development and outcomes within a broader context of interconnected factors at multiple levels of the surrounding environment (Bronfenbrenner, 1979; Lerner, 2005). In particular, the ecological theory is useful in helping social workers better understand the needs, experiences, and outcomes of foster children, and further to ensure that social workers offer appropriate programs and resources in the context of person-in-environment. Based on Belsky's ecological framework, this section provides an in-depth review of the theoretical underpinnings of a study of the costs of caring for foster children.

In the context of the foster care population, ontogenetic-level factors are conceptualized as factors describing child and parent characteristics. At this level,

accurate assessment and information about these individual factors, which are fundamental variables in cost studies, are essential to improve accuracy in measuring costs. In particular, several specific factors such as the foster child's age or the presence of a physical or mental disability or HIV may directly affect service usage and costs for the child. Aspects commonly used in assessing foster children's experiences and their outcomes can be categorized in the following distinctive areas (National Research Council, 1993): 1) socio-demographic factors such as the child's age at entry into out-of-home care, race, gender, and education of the birth parents; 2) emotional and developmental factors such as disability, intelligence, and academic achievement; 3) health-related factors including genetic factors; and 4) psychosocial factors including personality attributes of the child or caregiver (e.g., temperament, immaturity, rigidity) and psychological variables (e.g., self-esteem, depression, anxiety). Some scholars address behavioral factors in children who are in out-of-home care as a result of child abuse and neglect. Azar and Wolfe (1998) found that behavioral problems including both externalizing (e.g., impulsivity, noncompliance, aggressiveness) and internalizing (e.g., withdrawal, isolation) behaviors were reported for children in care. These problems may relate to difficulty in case management, and consequently may have a negative effect on the outcomes of out-of-home care.

At the microsystem level, the assumption is that the characteristics of the family as well as family functioning and parenting style impact the developing child (Tzeng, Jackson, & Karlson, 1991). A core of the microsystem is the interactions between birth parents or foster caregivers and children, and influences of the family system itself (Whittaker et al., 1986). When a cost study is designed to longitudinally track the costs

for children in out-of-home care or at risk of being placed in such care, the microsystem is of importance for measuring the costs, as there may be changes in the costs depending on when and where the children stay in care and how closely they interact with their birth or foster parents. Assessment of how parents relate to the child in care, whether positively or negatively, provides crucial information. For example, the interaction of parenting style and the child's response may result in circumstances promoting abusive or neglectful behaviors. Leslie and her colleagues (2005) found that most children in out-of-home care have experienced poor parenting strategies in birth families. In response to inappropriate parenting, a child may develop difficult behaviors, thereby increasing the risk of abuse and neglect. For foster children, Chamberlain and her colleagues (2006) suggested, interventions which focus on reducing behavioral problems of foster children and increasing foster/kin parenting skills could reduce placement disruptions.

Another critical factor at the microsystem level is the examination of the marital relationship in the family setting. Family interaction can demonstrate patterns of marital discord and could underscore the stress related to these problems, thereby influencing the child. Cummings and his colleagues (1994) found that marital conflict was associated with children's behavioral problems, especially external symptoms such as aggression and assaultiveness, which again may result in abuse and neglect. Consideration of the parental marital structure is also critical. McDonald and his colleagues (2007) found that a majority of foster children came from a birth family headed by a single female parent. This trend suggests that there may be increased stressors among single parents who attempt to manage and cope with household responsibilities.

Additionally, consideration of the impact of the child's living arrangement on the

foster care experience is critical and is highly linked with attachment between foster children and foster caregivers. From the ecological perspective, microsystem-level concerns draw attention to the actual placement setting as well as the interaction patterns between the child and caregivers in the foster care system (Barber & Delfabbro, 2004). Understanding how the quality of these connections affects the developing child and assessing the child's capacity to maintain these attachments would be informative.

Next, the exosystem, which encompasses both the ontogenetic and microsystem levels, emphasizes "the importance of viewing family functioning in the context of various social institutions and external forces that govern family and parent-child behaviors" (National Research Council, 1993, p. 132). For example, substance abuse is a major exosystem-level problem experienced by many families involved with the child welfare system. Chipungu (2003) argued that the failure of large-scale social efforts to combat major social problems such as poverty and drugs had caused far-reaching consequences for a large number of children and families served by the child welfare system. She further asserted that it takes a minimum of three years for a person actively seeking sobriety to recover. Given that child welfare workers face time constraints which require them to make permanency decisions within 12 months of foster care placement, parents with substance abuse problems often lack sufficient time to resolve those problems and be reunited with their children. While direct costs such as maintenance payments and subsidies at the ontogenetic and microsystem levels are often relatively easy to account for, indirect costs and overhead costs at the exosystem level, such as costs to other providers supporting the intervention as well as capital costs such as buildings and computers, may be more difficult to calculate.

Lastly, the macrosystem represents an even larger level of analysis that incorporates all the previously discussed social systems. Hodge and Anthony (1988) asserted that the macrosystem consists of laws, customs, and societal values. This suggests that federal and state child welfare policies are influenced by the values and beliefs of society such as equity, well-being, and human rights and that these policies, in turn, influence child welfare workers' decision-making processes and the type of permanency outcomes that foster children obtain. Additional issues of importance at the macrosystem level include broader economic factors (Garbarino, Galambos, Plantz, & Kostelny, 1992), national policy and resources, and socio-cultural characteristics (Tzeng et al., 1991). The macrosystem level also supports broader societal concerns for children such as family support policies, family leave, and health care (National Research Council, 1993) as well as child welfare policy itself. In the context of cost studies, the macrosystem is parallel to macro-economic theory which describes societal, political, and economic factors that facilitate or constrain changes within and outside programs (Shadish, 1987).

Because of its complexity, the ecological model enables an examination of the relationships and interactions between variables at differing system levels, which generates more comprehensive information (Tzeng et al., 1991) than relying on a single factor or on multiple factors at only one level. The foster care system operates within multiple interacting systems. An ecological perspective provides a broad theoretical guide to organizing a wide variety of factors relevant to this social context for foster children. As such, the ecological perspective provides an appropriate theoretical framework for better understanding foster care, assessing the interface between various systems, and

finding subsequent outcomes for foster children. It also serves as a useful framework to examine multiple levels of characteristics of children nested within counties and how these characteristics are related to foster care placements and costs.

Environmental and organizational context. Services provided by human service organizations are always influenced by factors external to the boundaries of the organization and by organizational structure and service delivery, or its organizational context. To better understand the influence of external factors on structures and service configurations of human service organizations, it is important to consider three major perspectives on organizations' choices of resources: political economy, institutional context, and network (Jones, 2006). Political economy, as a perspective for understanding human service organizations in a larger context, emphasizes the impact of the external environment on the internal structure of an organization. An organization's potential for survival and successful provision of services is fully or partially dependent on its ability to obtain and utilize resources, power, and legitimacy (Jones, 2006; Wamsley & Zald, 1976). Many organizational practices, such as the service delivery system, will reflect the constraints and contingencies imposed by those who control needed resources (Hasenfeld, 2000).

Whereas the political economy perspective stresses the importance of economic and political factors in obtaining resources and legitimacy, the institutional perspective enhances the political economy perspective by addressing values and cultural norms and the use of a single organization as the unit of analysis (Hasenfeld, 2000). According to the institutional perspective, the ability of an organization to follow institutional rules determines its survival (Hasenfeld, 2000; Jones, 2006). The rules that an organization

must follow are comprised of three structures: regulative (e.g., laws, regulations, codes), normative (e.g., values and norms), and cognitive (e.g., socially constructed categories and typologies) (Hasenfeld, 2000; Scott, 1995).

Beyond resources from and actions by the individual organization, the relationships that an organization develops with other organizations and institutions also work to limit or maximize resources within the organization, according to the network perspective. Many researchers, policymakers, and practitioners assume that treatment outcomes will improve as organizations form integrated service delivery networks (Alter & Hage, 1993; Dill & Rochefort, 1989; Provan & Sebastian, 1998). According to Milward and Provan (1998), "Social network analysis is focused on the structure of relationships among networks of individuals or organizations where the network consists of a set of nodes linked by a set of social relationships" (p. 388). For example, in the child welfare field, residential facilities interact with mental health agencies, school systems, medical facilities, the judicial system, and a host of other agencies to provide the spectrum of services children need. Therefore, the relationships among organizations in a task environment (e.g., sharing of resources, co-sponsored programs, referrals, case management) are also important in modeling the external determinants of an organization's service delivery system (Jones, 2006).

Given the impact of those external factors on an organization's structure and service delivery system, recent scholarship has suggested that public goods provision may be understood as a hierarchical process in which the technical production of public goods at the level of the individual frontline worker is nested in a managerial environment that is itself situated in an institutional environment (Hill & Lynn, 2004;

Lynn et al., 2001). Researchers have focused on the internal process of service implementation through human service organization, that is, whether the implementation is a top-down or bottom-up phenomenon. Top-down models have focused on policymakers/designers as central actors in the policy implementation process and view implementation largely as an administrative process (Lynn et al., 2001; Matland, 1995). Lynn and his colleagues (2001) argued that institutional forces (e.g., laws and legislative-bureaucratic interactions) may affect managerial behaviors (e.g., interactions between the administrative and structural aspects of an organization), which would ultimately shape frontline technical work (e.g., interactions between service recipients and their case managers). Bottom-up models have viewed implementation as starting with the identification of a policy problem and involve the input of target groups and frontline workers in the identification of policy solutions. The top-down approach is useful in cases where policy is clear and implementation is in the early planning stage, while the bottom-up perspective is applicable in cases where goal ambiguity is high and implementation is in the later evaluation stage (Matland, 1995).

Some degree of discretion at the level of the frontline worker in street-level bureaucracies is inherent (Fox, 1990). Lipsky (1980) described the work of frontline workers in terms of the conditions of work and worker responses to those conditions. He concluded that street-level bureaucrats work autonomously with a great deal of discretion and are stuck between the conflicting values and demands of clients and organizations. How to manage worker discretion has long been an important issue in the field of public administration. Vinzant and Crothers (1998) suggested that discretion can only be understood and managed as an act of street-level leadership. Others have suggested that

discretion can be managed through “incentives” and/or “inspiration” (Meyers, Glaser, Dillon, & MacDonald, 1996).

Environmental and organizational context and foster care. The human service delivery system in the U.S. is generally composed of a lot of categorical programs, each having its own financial and programmatic relationships to federal, state, and local governments and each designed to provide a specific service for one or more categories of the population (Alaszewski & Harrison, 1988). The child welfare system also has had a long history of bureaucratic involvement. The Personal Responsibility and Work Opportunity Reconciliation Act of 1996 (PL 104-193) and the Adoption and Safe Families Act of 1997 (PL 105-89) increased federal funding for state adult welfare and child welfare services, specifically those that move children and families through the child welfare system more efficiently without compromising child safety (U. S. House of Representatives, 2004).

States, many of which were faced with increasing numbers of abused and neglected children entering out-of-home care in the mid- to late 1990s, responded to these increases in federal child welfare funding by increasing their own outlays on existing child welfare programs; some states also requested federal Title IV-E waivers in order to implement policy and programmatic innovations that often retained the cost- and efficiency-focused emphases of federal initiatives (Bess et al., 2002; U.S. House of Representatives, 2004).

There are variations in service provision among child welfare agencies, which affect the direct and indirect costs of foster care. These variations may be due to the organizational structure and lines of authority of child welfare services. Local and state

departments of health and human services or departments of social services are either completely controlled by the state (i.e., state-administered and state-run systems), or have shared control between the state and the county (i.e., state-administered and county-run systems). The overall structure of any agency is a hierarchy consisting of the frontline social workers (who provide the direct services to children and families), supervisors, program managers, department directors, and county or state commissioners. The size of the organization determines its number of structural levels, with all levels present in major metropolitan-based agencies and fewer levels (often only two workers and a supervisor/director) in smaller, rural settings. In state-controlled settings, the hierarchy is larger as it includes those at the state as well as the local or regional jurisdiction. In state and county shared-control settings, there is much more variation across agencies.

In a state- and county-shared system, county commissioners direct the activities of the agency directors by setting local policy and budgets. Agency directors, or program managers in larger systems, receive policy directives from the county commissioners and combine them with federal child welfare policy to establish the policy framework for the organization. Social work supervisors then interpret this framework and translate it for application by workers in the field (Kadushin & Harkness, 2002). Workers then apply these policies in the field, implementing the task of the agency to respond to children and families involved in the child welfare system. These positions and roles are fairly specialized, with an increase in position specialization corresponding with an increase in agency size (Comstock, 2004; Weber, 2001).

Smith and Donovan (2003) made three related points that are supported by studies of frontline workers in other human service sectors. First, frontline decision-making

responds rationally to institutional and organizational factors. Caseworkers will provide services in a manner that allows them to protect their relative legitimacy within the agency (Hasenfeld, 1983). Second, it is possible for frontline practice to become routinized or standardized, even if the routinization of frontline practice is not an expressed organizational or system-wide goal. These routines can include devoting more attention to clients with basic needs, and limiting the amount of information offered clients. This point is similar to the central premise in the work of Lipsky (1980), that is, frontline practice is characterized by substantial discretion, and given such freedom of action, case managers adopt routines that reduce complexity and simplify their jobs. Third, where institutional and organizational pressures limit caseworkers' ability to respond to client needs, routinization may take a form contrary to best practices or the intent of public policy. For example, some studies suggest that restrictive government-imposed client eligibility rules may prevent human service agencies from serving their clients effectively (Salamon, 1995; Smith & Lipsky, 1993).

While foster children and families are more likely to receive services if the departments and frontline staff caring for them are well-supported, organizational resources such as the number of service staff, the number of service slots available, and the variety and number of programs offered by the organization also influence service provision and service costs, directly as well as indirectly (Blitz, Solomon, & Feinberg, 2001). For example, an agency with few therapists on site resultantly has few slots for therapy available, thus making it more difficult for a foster child needing such treatment to receive it. These resource constraints may also indirectly affect service provision and costs by altering the tasks of frontline staff (Vinzant & Crothers, 1998). As Brodkin (1997)

notes, “caseworkers ... do not do just what they want or just what they are told to want. They do what they can” (p. 24).

Child welfare agencies are also required by law to relate to a set of other organizations that form their interorganizational environment. Licensed child welfare providers must interact with public bureaucracies, which retain the ultimate jurisdiction over the children in their care; the judicial system, which controls the movement of children through the child welfare system and often influences service provision; and other public and private service providers, which provide specialized services to meet the needs of children and their families. Studies have suggested that public bureaucracies constrain service providers that are heavily dependent upon public funding by limiting their flexibility to serve clients (Backman & Smith, 2000; Salamon, 1995; Smith & Lipsky, 1993). The courts also reduce the ability of child welfare agencies to make service decisions autonomously on behalf of foster children and their families. Case flow decisions are ultimately controlled by courts, which monitor the permanency plans and service plans that case managers prepare for foster children and their families (Petr & Johnson, 1999; Snell, 2000).

Some empirical research has revealed differences in foster care usage across agencies in different geographic areas in light of these environmental and organizational contexts. For instance, after examining data from counties in ten states from 1990 to 1999, Wulczyn and Hislop (2002) found that urbanicity was a predictor of length of time spent in care and that factors associated with social disorganization may have played a role in the higher rate of foster care use for children in urban counties compared to children in other counties in the study. They also noted that “the analyses presented here also suggest

that the underlying administrative processes may be influenced by attributes of place other than the social conditions typically associated with urban areas" (p. 32) and "it would be well worth the effort needed to identify the organizational characteristics that contribute to these outcomes, including funding and staffing patterns" (p. 33).

Findings from the nationally representative National Survey of Child and Adolescent Well Being (NSCAW) further illustrate the importance of locale and organizational context. Conducted in 1999, the NSCAW survey collected detailed information on the administration of child welfare in a sample of 92 agencies. Findings noted in the local and state agency reports (USDHHS, 2001a, 2001b) provide important clues about the importance of context in determining child outcomes, including the significance of poverty, urbanicity, and administrative structure as predictors. State-administered programs had greater success in accomplishing adoptions, due in part to increased adoption resources. Kinship placement was more common in large urban areas. Urban counties were found to be moving more quickly than non-urban counties in reorganizing their services, were more likely to have created interdisciplinary teams with their county's TANF program, and were more likely to offer neighborhood services. Notably, provision of foster care payments in conjunction with normal licensing requirements for kinship foster care was more common in urban counties, and these counties also had higher adoption rates than other counties, in part because they were more likely to have developed specialized recruitment resources.

Conceptual Framework

A theoretical framework based on ecological theory, the environmental perspective, and the organizational perspective focuses on the relationship between

children and their environment in order to assess how multiple levels of characteristics are associated with foster care services and outcomes. Such a framework provides a contextual foundation for examining the extent to which child and local characteristics play a role in the costs for foster children. As such, the conceptual framework for this study is based on the notion that costs for caring for foster children are associated with not only the children's individual characteristics and experiences, but also county-level factors, including county characteristics and local agency policies and practices. Given the variations in foster care costs and the nested structure of children served within counties, this study used a multilevel analytic strategy to evaluate the effects of individual- and county-level factors on foster care costs.

First I examined the effects of individual-level factors on out-of-home care costs. Foster care costs were modeled as a dependent variable, and the child's demographic characteristics, prior maltreatment history, foster care experiences, and reason for exit from foster care were included as predictors. Then, I evaluated a number of county-level factors as predictors, including the county's socioeconomic and demographic characteristics of the child's county and the foster care practices of the child's local child welfare agency. Finally, I examined whether there are significant cross-level interactions between child-level factors and county-level factors. In other words, the magnitude of the relation between child-level factors and foster care costs may vary depending on county characteristics or local agency practices. A conceptual model is shown in Figure 1, which depicts how county-level factors, child-level factors, and their interactions are related to costs for caring for children in out-of-home care.

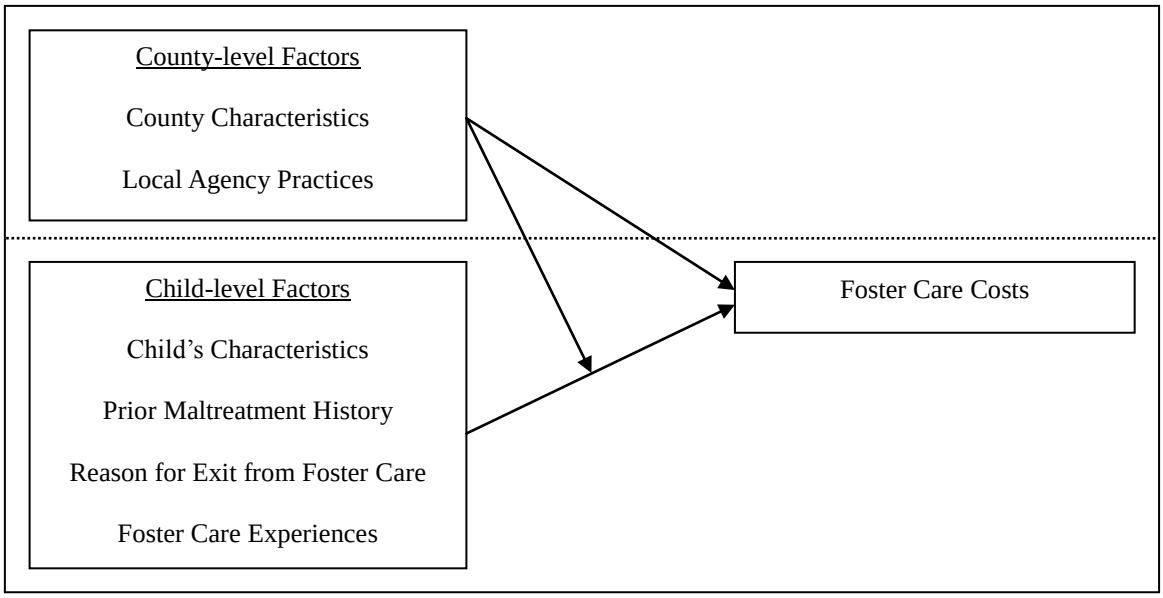


Figure 1. Conceptual model

CHAPTER 3

LITERATURE REVIEW

Factors on Costs for Caring for Foster Children

Costs for caring for foster children vary by individual, local agency, and county factors. In regard to individual-level factors, research has emphasized the importance of the following determinants related to foster care outcomes and costs: children's socio-demographic characteristics, previous history, their problems and needs, and services used. While there has been less research on the relationship between macro-level characteristics and child welfare services and outcomes compared to individual-level focused research, the literature emphasizes the following macro-level factors: agency policy and practice, agency staffing, and socio-demographic characteristics of the county in which the agency is located. This section presents a comprehensive review of the complex inter-relationships between the characteristics, problems, and outcomes of foster children, as well as their service usage, and the characteristics and practices of local agencies and counties. Gaining an understanding of these complex interrelationships is the key to estimating costs of out-of-home care (Beecham, 2000).

Micro-level factors.

Age. Age is one of most important factors associated with costs primarily because the standard maintenance payment rate in most states increases with the age of the child. For example, in North Carolina, the standard board rate ranges between $390 and $490 per month, depending on the age of the child (Wildfire et al., 2008). Also, the age of the

child is the most important predictor in the length of time a child will stay in the foster care system and consequently is likely to affect the costs of out-of-home care (Kemp & Bodonyi, 2000; Smith, 2003; Vogel, 1999).

Empirical evidence supports the notion that as age increases, a child's vulnerability to placement instability increases. Older children have usually experienced a higher number of placements than younger children (Smith, Stormshak, Chamberlin, & Bridges, 2001; Webster et al., 2000). Also, placement at a younger age makes it easier for the child to remain in his or her first placement for a longer period of time and have fewer subsequent placement disruptions (Barber et al., 2001; Cantos, Gries, & Slis, 1996; James, Landsverk, & Slymen, 2004). One reason older children have difficulty with placement stability is that they may have been in unsafe environments longer and learned poor coping mechanisms. The literature on the association between age and permanency is consistent. In general, older children tend to remain in foster care without permanency (Hines et al., 2007). And, research has demonstrated that the age of the child at removal is a predictor of adoption (Wulczyn et al., 2005). Schmidt-Tieszen and McDonald (1998) found that an increase of one year in a child's age increased the odds of long-term foster care by a factor of 1.39. Some of the reasons for this trend may include older children not being seen as attractive for potential adoptive parents and increased behavioral and/or emotional difficulties. Research findings also have demonstrated that child age at removal is a factor related to reentry, with infants having the highest odds for reentry compared to all other age groups (Frame, 2002; Frame, Berrick, & Brodowski, 2000; Shaw, 2006).

Race/ethnicity. While the majority of children in out-of-home placements are

Caucasian, the number of minority children in care is increasing, and they are over-represented in the foster care population (Garland & Besinger, 1997; McKelvey & Stevens, 1994). This is because race/ethnicity is associated with the socioeconomic status of the birth family. That is, it is suggested that minority children are more likely to come from families that are AFDC/TANF-eligible and have only one parent, which, in many cases, results in inadequate caregiving due to unemployment or underemployment (Harris & Courtney, 2003). Consequently, these children are more likely to be exposed to an unhealthy environment and, as a result, become involved in child welfare system.

In general, research findings indicate that race/ethnicity is a factor related to length of stay in out-of-home care. A common finding is that African American children have longer lengths of stay than children of other races and ethnicities (Glisson et al., 2000; Harris & Courtney, 2003; Smith, 2003; Wells & Guo, 1999; Wulczyn, 2003). The role of race/ethnicity also factors significantly into foster care outcomes. African American children have been far less likely than Caucasian children to be reunited with their families (Goerge & Bilaver, 2005; Hill, 2005; McDonald, Poertner, & Jennings, 2007) and have been significantly less likely to be adopted compared to Caucasian or Latino children (Barth, 1997b; Barth, Courtney, & Berry, 1994). Race/ethnicity is also considered a factor related to reentry. For example, African American and American Indian children reenter care at much higher rates than other children (Courtney, 1994; Shaw, 2006; Terling, 1999).

One of the reasons for the poor foster care outcomes of minority children is that they are more likely to come from families that have complex problems (e. g., parent(s)' health/mental health condition, financial hardship, housing problems), and the effects of

these problems still linger even after children are removed from home. And, these children are more likely to be exposed to these poor environments for a longer period of time before entering foster care and to have serious behavioral and psychological problems, which themselves are predictors of long-term stay in foster care and placement instability. Given the intractability of their birth families' problems and their longer exposure to a poor environment, minority children are more likely to be at risk for re-victimization (Roberts, 2002).

Prior history. The presence of a prior history of abuse and/or neglect in children who are placed in out-of-home care is strongly associated with improper parenting, which is affected by physical and mental health problems, alcohol and substance abuse, low socioeconomic status, and lack of familial and social support. Removal reasons of children who enter foster care are also related to these children's placement stability and their length of stay. Previous research on the relationship between prior history of abuse and neglect and length of stay in foster care has reported conflicting results. According to Webster et al. (2000), children removed from their biological parents for physical or sexual abuse were more likely to experience placement instability than children removed due to neglect. And children who have been physically abused are more likely to experience a decreased probability of being adopted (Barth et al., 1994). Also, some research suggests that children who have been sexually abused experience placement instability and longer lengths of stay and are not as likely to be reunified or adopted, possibly due to the more detrimental impact of such abuse on a child's emotional health (Connell et al., 2006; Glisson et al., 2000; James, 2004).

Conversely, some research findings indicate that children removed from the home

due to physical abuse experience shorter lengths of stay in out-of-home placement compared to children removed because of neglect (Harris & Courtney, 2003; Slaght, 1993). Lie and McMurtry (1991) also suggested that foster children entering the system due to sexual abuse were likely to exit foster care more quickly than those entering for other types of maltreatment. The inconsistency of findings regarding prior history of foster children is likely due to researchers' use of differing data sources—administrative data in some studies, and case file review and interviews in others. Findings may also vary because of variations in state law and policy and differences in research design and method, sample size, and quality of data. However, most researchers have agreed that severity of child maltreatment is a strong predictor of length of stay, placement stability, and permanency (Courtney, 1994; Glisson et al., 2000). Serious maltreatment from the birth family results in physical and mental problems, which may affect children's experiences and outcomes in foster care.

Specific problems of the foster child. The specific problems which foster children currently or potentially have are particularly important in cost studies, because children's problems and needs affect the type and restrictiveness of services they receive and thus are directly related to the costs of service use. Studies have observed that children who are identified as having emotional and behavioral problems, developmental disabilities, and mental health issues have longer lengths of stay in out-of-home care (Becker, Jordan, & Larsen, 2007; Glisson et al., 2000; Landsverk, Davis, Ganger, Newton, & Johnson, 1996). Children with a higher number of placement moves are more likely to be receiving mental health services while in care (Needell et al., 2002). When children exhibit emotional or psychological problems, eating disorders, suicide threats, or bed-wetting,

they are more likely to experience placement disruption and reentry (Courtney, 1994; Zwimpfer, 1983). Placement instability such as multiple placement moves has been associated with increased mental health costs for foster children, which are in turn associated with increased physical health care costs (Rubin et al., 2004).

Regarding behavior problems, in one study, foster children with behavior problems were twice as likely to experience placement moves compared to foster children who changed placements for other reasons (Runyan & Gould, 1985). Like mental health problems, behavioral problems are both the cause and a consequence of frequent placement disruptions (Newton, Litrownik, & Landsverk, 2000). Furthermore, children who initially had few behavioral problems may be at the greatest risk of being harmed by placement moves (McRoy, 1994). Disability has also been shown to be related to foster care experience. Children who participated in special education, children who were considered to be developmentally delayed, and children who were diagnosed with failure to thrive at the time of foster care placement were found to have significantly longer stays in care (Benedict & White, 1991), and children with special needs took longer to return home or be placed for adoption than non-disabled children (McMurtry & Lie, 1992).

Family-related variables. Family characteristics encompass various aspects such as family structure, the family-child relationship, and family income. Lower-income children enter the foster care system in greater numbers and tend to stay longer (Albers, Reilly, & Rittner, 1993). In one study, about approximately 60% of foster children came from families that were Title IV-E eligible (Duquette & Hardin, 1999). Family structure and socioeconomic status have been shown to predict time spent in out-of-home care.

Children removed from two-parent families have shorter lengths of stay and higher reunification rates than children removed from single-parent homes (Glisson et al., 2000; Hines et al., 2007; Wells & Guo, 1999). Low-income single-parent families are more likely to have children involved with child welfare services compared to other families (Culhane, Webb, Grim, Metraux, & Culhane, 2003; Lindsey, 1992; Schuerman, Rzepnicki, & Littell, 1994).

And, McKelvey and Stevens (1994) found that 42% of children in placement were members of a sibling group. Children placed in out-of-home care without their siblings moved less frequently than children who were in out-of-home care at the same time as a sibling (Wulczyn et al., 2003). And children who had siblings placed in out-of home care showed slower rates for reunification and adoption than other children (McMurtry & Lie, 1992; Tam & Ho, 1996). Increased parent-child visits while the child is in out-of-home care are associated with decreased time in care and consequently faster reunification (Hess, Folaron, & Jefferson, 1992; McMurty & Lie, 1992; Seaberg & Tolley, 1986). Parental emotional problems and parent enrollment in AFDC (now TANF) have been associated with increased time in out-of-home care (Albers, et al., 1993; Seaberg & Tolley, 1986). With regard to reentry into foster care, several parental characteristics have been identified with increased reentry rates, including low parental functioning, parental substance abuse, lower socioeconomic status, parental criminal activity, lack of social support, and presence of housing problems (Courtney, 1994; Festinger, 1994; Frame et al., 2000; Miller, Fisher, Fetrow, & Jordan, 2006; Terling, 1999).

Macro-level factors.

Agency policies and practices. Research has suggested that administrative

procedures may significantly affect foster care outcomes and that it is important to examine whether a specific procedure was implemented or omitted by agencies in conjunction with other factors such as the availability of resources (Maluccio et al., 1980; Rooney, 1982; Sosin, 1986). Government regulations also affect agency policies and practices, and these regulations (or agencies' procedural and substantive interpretations of these regulations) may result in decisions that affect the allocation, management, and mobilization of resources both inside and outside the agencies (Edelman, 1992). Local agencies have also made efforts to reform their systems and produce better outcomes. For instance, local agencies that have implemented child welfare reform initiatives (e.g., Families for Kids, Family to Family) have shown decreased numbers of children being placed in out-of-home care (Usher et al., 2002) and a reduction in length of stay in care (Usher et al., 1999).

Among various types of out-of-home placements for foster children, kinship care vs. non-kinship care has been a hot issue in child welfare research, because there are variations among county agencies in the ways of handling the problems, needs, and the paths to permanency for children in relative placements versus other types of placements. Most studies examining placement stability report that children placed with relatives move less and have greater stability in their placements than children living in other placement types (Chamberlain, Price, Reid, Landsverk, Fisher, & Stoolmiller, 2006; Usher et al., 1999; Wulczyn et al., 2003). This suggests that placing the foster child with relatives may lead to fewer mental health and behavior problems (Iglehart, 1994). Zuravin, Benedict, and Stallings (1999) observed that individuals reared in foster care by relatives reported an overall higher level of well-being as adults than those reared in

foster care by non-relatives.

Other research suggests that kinship foster care can lead children to languish in care instead of moving on to reunification or adoption. Some studies found that children in kinship foster care spend longer periods of time in care and are less likely to be reunified with parents (Berrick, Needell, & Barth, 1999; Scannapieco, 1999; Courtney & Wong, 1996; Wulczyn & Goerge, 1992), and that children in relative care are less likely to be adopted than children in other type of placements (Berrick, Barth, & Needell, 1994; Thornton, 1991). Meyer and Link (1990) suggested that birth parents would have less incentive to work hard toward reunification if children were with relatives than if they were with non-relatives since the parents were able to visit often and were likely to have a positive perception of the placement. But, children placed with relatives during their removal from home consistently show lower reentry rates than other types of placement (Shaw, 2006; Wells & Guo, 1999). This is probably because physical aids and/or emotional supports from extended family members help children and immediate families to reduce the recurrence of child abuse and neglect and consequently reduce the likelihood of reentry into foster care.

Local agencies' use of non-family placements such as group homes and institutional care may affect foster children's experiences, costs, and outcomes in the child welfare system. For example, some research found that placements in non-family settings were related to a lower likelihood of being adopted or discharged to custody or guardianship with relatives or other caretakers (Courtney & Wong, 1996; Wulczyn et al., 2007).

Agency staffing. In regard to agency staffing, many activities performed by

individual child welfare caseworkers within local agencies are vital to the success of the permanency planning process, because caseworkers and their supervisors are the individuals most often making permanency planning decisions for children (Weissman et al., 2003; Wells, Lyons, Doueck, Brown, & Thomas, 2004). When these activities are not adequately performed, they become a barrier in the permanency planning process. Social work training has been shown to increase caseworkers' effectiveness. In one study, caseworkers who held a degree in social work were more likely to implement a permanency plan within three years of a child entering foster care than those caseworkers without a degree in social work (Albers et al., 1993). Other research has shown that persons with BSWs and MSWs were better prepared than their non-social worker counterparts in nearly every dimension of child welfare practice (Dhooper, Royse, & Wolfe, 1990; Lieberman, Hornby, & Russell, 1988).

Caseworkers with smaller caseloads are generally able to provide more intensive services to clients. These two factors (i.e., smaller caseloads and intensive services) were correlated with an increase in successful permanency planning outcomes (Steinhauer, 1991). Conversely, having a higher number of caseworkers serving a case increased the length of stay in out-of-home care and was negatively associated with the likelihood of reunification in one recent study (Ryan, Garnier, Zyphur, & Zhai, 2006). Research has also found that high turnover of workers and staffing shortages may result in negative outcomes for children in the child welfare system (DePanfilis & Zlotnik, 2008).

Environmental context. Foster children's experiences in the child welfare system may be influenced by the socio-demographic characteristics of their county, because most placements occur within the geographical boundaries of the child's home county. Some

studies have identified that children placed in urban settings have shorter lengths of stay than children placed from more rural areas (Courtney, 1994; Glisson et al., 2000). This trend may be a result of a general lack of resources (e.g., families trained to care for children with special needs, affordable and safe housing, or specialized therapy) in rural areas, which makes a permanency plan difficult to achieve (Albers et al., 1993). In addition, research has found that children from rural areas had a lower likelihood of adoption but a greater likelihood of exiting to custody or other guardians than those from urban areas (Courtney & Wong, 1996). There is also some evidence that children living in more densely populated communities may be at higher risk for foster care use (Glisson, et al.; 2000; Wulczyn & Hislop, 2002). This finding suggests that aggregate community characteristics regarding social and economic well-being may be related to foster care use for a particular geographic area.

Research on Costs for Caring for Foster Children

While the majority of research has focused on aggregate costs for federal, state, and local funding for child welfare services (Foster, 2001; Foster & Holden, 2002; Bess et al., 2002), there is a handful of research on costs of out-of-home care and/ or adoption at the individual level (i.e., the costs for each individual child). However, these studies on individual-level costs still did not examine child welfare costs using multilevel analytical methods in the context of the nested nature of children within counties. Despite these limitations, prior research can serve as a starting point in our search to understand how to estimate costs for targeted children in child welfare services. This section reviews several examples of cost studies in child welfare services, especially those examining costs of children who have entered the child welfare system.

Cost analyses for out-of-home care. Some researchers have conducted cost analyses of various types of out-of-home care. For example, there is much debate regarding the long-term costs of kinship care. This issue is complicated by variations in states' payment policies. While some states pay kinship foster parents the same subsidy as that paid to non-kin, others pay relatives less, usually at the rate of welfare benefits such as AFDC/TANF. Other states pay a subsidy in the mid-range between welfare benefits and the foster care subsidy rate (Testa, 1997). These disparities in subsidies are correlated with marked differences in foster children's long-term living arrangements. In one state, it was found that children whose kin caregivers received foster care subsidies were more likely to remain in long-term foster care and less likely to reunify with birth parents (Berrick & Needell, 1999). In this study, the researchers found that about half of the children whose kinship caregivers were receiving foster care subsidies were reunified with their birth parents within four years compared to two-thirds of children whose kin caregivers were only receiving welfare payments such as AFDC/TANF. The lower rates of adoption for children placed with kin and the limited opportunities for kin to elect legal guardianship (most states do not pay a subsidy to kin who take guardianship) suggest that a study examining the comparative costs of long-term foster care vs. subsidized guardianship or adoption may be useful (Courtney & Needell, 1997).

Although it is believed that youth who receive effective residential care have more favorable outcomes when they enter adulthood than youth who receive no services at all, residential care is nonetheless one of the costliest child welfare services. A study of children with serious emotional disturbances who had been placed in residential treatment facilities for educational purposes reported the average monthly cost per child

to be $6,316 (Hoagwood & Cunningham, 1992). Therapeutic foster care (TFC) appears to cost less than residential care. Estimates are that TFC programs require one fifth to one third less funding than residential centers or group homes that serve comparable populations (Curtis, Alexander, & Lunghofer, 2001; Kutash & Rivera, 1996). One study found that the Oregon TFC model, which targets serious and chronic juvenile offenders, was among the approaches that resulted in the greatest savings to state taxpayers (Aos, Phipps, Barnoski, & Lieb, 1999). In two years, program costs were recouped through savings in reduced arrest and incarceration rates and decreased costs for the criminal justice system and victims (Washington State Institute for Public Policy, 1998).

Costs analyses for adoption vs. foster care. Some researchers have argued that adoption assistance is a cost-effective alternative to long-term out-of-home care, because expenditures on adoption subsidies are considerably lower than they are for foster care, and adoptive families contribute substantial resources on behalf of their adopted children (Barth, 1997a; Barth et al., 2006; Gilles, 1995; Sedlak & Broadhurst, 1993). Only a few research projects have focused on the public costs of foster children vs. adopted children. Sedlak and Broadhurst's (1993) work provides one of the best examples of a social cost-benefit analysis in child welfare research. In a national study of the impact of adoption assistance programs, they compared the financial and human costs to children placed with adoption assistance vs. the costs associated with children remaining in out-of-home care until emancipation. Using federal and state data, they found that adoption assistance showed a substantial savings over out-of-home care. That is, for each child receiving adoption assistance, $146 fewer dollars were spent each month as measured in 1988 dollars. They projected that federal and state governments would save a total of $1.6

billion in administrative costs alone for the 40,700 children studied whose families received adoption assistance.

In addition to cost accounting, Sedlack and Broadhurst also discussed the physical, emotional, and intellectual outcomes and social competence of children who continued in out-of-home care vs. those who were adopted. The study used comparison information from a national study of children discharged from family foster care to develop predictions of the outcomes of the adopted child population and the outcomes that would have been expected for them had they not been adopted. The researchers concluded that out-of-home care is more costly than adoption in terms of the effect on outcomes for the children themselves. This study has a limitation, however, in that it assumes that children who are not adopted remain in foster care until emancipation. This assumption may lead to an overestimation of the true costs of foster care because some children return home or otherwise leave the system.

A more recent study (Barth et al., 2006) using longitudinal data in North Carolina attempted to create a more precise comparison between similarly situated foster and adopted children. The researchers considered costs of care for those who leave care before age 18 as well as for those who remain in care until age 18. The study also included a variety of sources of costs related to foster care and adoption. According to Barth and colleagues' estimates, foster care costs for the first 7.7 years totaled approximately $86,100 per child. This figure is derived from an estimated $8,000 in court-related costs, $16,000 in case management costs, $41,299 in direct reimbursement for care, $6,000 in the cost of independent living services, and $14,800 in medical costs. In comparison, the total costs estimated for the care of an adopted child during the same

period were about $65,100. This total reflected approximately $2,000 in court-related costs, $37,337 in direct costs, $20,000 in administrative costs, and $5,760 in medical costs. Thus, a child who was adopted would cost the government approximately $21,000 less over the first 7.7 years, which includes both the time in foster care before adoption and the time after adoption, than one who remained in foster care during the same period.

Barth's study brings a better understanding of individual-level costs of foster care and adoption by providing a longitudinal estimate of the governmental costs of services for long-term foster children and adopted children. However, the study has two major limitations in its methods of cost estimation. First, the indirect costs that are cited are not based on actual expenditures but instead rough estimates, which cause an imprecise cost accounting. Second, there was no consideration of detailed variations in costs for children depending on their characteristics and experiences in out-of-home care and adoption.

CHAPTER 4

METHODS

Research Questions and Hypotheses

The purpose of my research is to better understand variations in the costs of children in out-of-home care in a multilevel context. Specifically, I used longitudinal data to examine how a foster child's individual characteristics (including demographics and prior maltreatment history) and foster care experiences, plus the environmental and organizational factors of the local child welfare agencies serving that foster child, affect foster care costs over time. The following research questions and related hypotheses are evaluated:

Research Question 1: How are individual-level factors related to costs for children in out-of-home care?

- Hypothesis 1-1: The demographic characteristics of children in out-of-home care affect the likelihood and the amount of foster care costs.
- Hypothesis 1-2: The likelihood and the amount of costs for children in out-of-home care differs by prior maltreatment history.
- Hypothesis 1-3: Variations in foster children's experiences in out-of-home care affect the likelihood and the amount of foster care costs.

  Hypothesis 1-4: The likelihood and the amount of foster care costs varies by reason for exit from foster care.

Research Question 2: Is there an association between county-level factors and costs of

out-of-home care?

- Hypothesis 2-1: The socioeconomic and demographic characteristics of the counties where foster children live affect the likelihood and the amount of foster care costs.
- Hypothesis 2-2: Variations in local agencies' practices affect the likelihood and the amount of foster care costs.

Research Question 3: Do county-level factors moderate the effects of individual-level factors on foster care costs?

- Hypothesis 3-1: Cross-level interactions between individual-level and county-level factors are related to the likelihood and the amount of foster care costs.

Study Sample

The study sample consists of children in North Carolina (N=32,978) who entered foster care for the first time between state fiscal year (SFY) 2001 and SFY 2006 (i.e., July 1, 2000 – June 30, 2006). A total of 23,519 of these children were ever placed in paid foster care placements, while the other 9,459 children did not have any foster care costs. Information about these children was extracted from two datasets about children in North Carolina: one about foster children's experiences and the other about individual-level monthly-based costs. The datasets were able to be linked using child-specific unique ID numbers. The merged data allowed me to track the monthly costs for these children. Information on the experiences of these children from their first day in placement to exit from foster care in the first spell only was included in the study. Experience histories of children still in care in October 2010 were truncated at the end of that month. There are several reasons for using first spell data only. First, most children have only one spell of

care in their lifetime. (In this study, only 8.6% of the study sample had two or more spells.) Therefore, first spell data is representative of the lifetime experiences of most foster children. Second, experiences of children who have multiple spells are fundamentally different from those who have only one spell in that their first attempt at permanency when leaving foster care failed. As a result, their experiences in their second spell in care are likely to be different from children who have only one spell in care. Third, most children are censored in the second spell.[4] Finally, the analytical framework of this study does not allow the testing of multiple outcomes. Table 1 presents the sample population for each entry cohort.

Table 1. The sample population for each state fiscal year

Entry cohort (state fiscal year)	Number of children entering foster care for first time	Number of children ever placed in paid foster care
July 2000 – June 2001 (SFY 2001)	4,903	3,568
July 2001 – June 2002 (SFY 2002)	5,146	3,749
July 2002 – June 2003 (SFY 2003)	5,264	3,719
July 2003 – June 2004 (SFY 2004)	5,564	3,844
July 2004 – June 2005 (SFY 2005)	6,006	4,237
July 2005 – June 2006 (SFY 2006)	6,095	4,402
Total sample	32,978	23,519

Study Data

This research employed data from several administrative data sources from the U.S. Census Bureau and the North Carolina Division of Social Services (NC-DSS).

Child-level data. The primary data on children's demographic characteristics and their experiences in the child welfare system was obtained from the University of North Carolina at Chapel Hill (UNC) longitudinal child welfare data file. In collaboration with

[4] If the relationship of first spell focused predictors and the costs in other spells or total costs including all episodes is tested, it may result in incorrect estimate.

NC-DSS, the research team of the North Carolina Child Welfare Program has compiled information on placements of all children entering the foster care system into a longitudinal dataset (Duncan, Kum, Flair, & Stewart, 2010). The dataset includes information on all North Carolina children who have entered foster care placements since the early 1990s and provides information about children's demographic characteristics, their prior histories (e.g., maltreatment type, reason for placement), and their foster care experiences (e.g., placement type, length of stay in placement, reason for exit from the foster care system).

To calculate the maintenance costs of out-of-home care, I used a dataset extracted from North Carolina's Child Placement and Payment System (CPPS). The main purposes of CPPS are (a) to collect information on all children who are in out-of-home care and receive adoption assistance; (b) to collect information regarding expenditures made by county departments of social services for foster care assistance payments; and (c) to generate reimbursement of state and/or federal funds (NC Department of Health and Human Services [NC-DHHS], 2007). The cost dataset includes information on the actual dollar amount paid for out-of-home maintenance (monthly-based), payment type, funding source and structure, and facility ID, as well as the foster child's individual ID.

County-level data. Three sources of data were used to obtain information on counties in North Carolina. First, several aggregated variables regarding county child welfare characteristics were employed from the UNC longitudinal child welfare dataset, which contains detailed information on types and durations of placements for each foster child. For example, the dataset includes information about whether or not each foster child was ever placed with relatives, ever placed in a non-family setting, and/or ever

placed in a group home. These personal experiences can be easily aggregated by county, and the aggregated information provides statistics about county agencies' practices for foster children.

Second, to obtain information about each county's foster care service capacity, I used another administrative dataset from the NC-DSS. This dataset contains the number of foster home and licensed facilities in each county and the number of beds they contain. This bed count was totaled for each county for each year and the total was averaged by the number of years in the study period.

Third, data from the U.S. Census Bureau was used to obtain population and poverty data for each county. Population data was taken from the annual county resident population estimates published by the Census Bureau's Population Division. This data includes information such as age, sex, and race/ethnicity. Poverty data was obtained from the Census Bureau's Small Area Income and Poverty Estimates (SAIPE) Program, which provides information about the number and percentage of people in poverty for each county for each year. Because county demographic information varies from year to year, I extracted data for each year in the study period and then averaged the information for each county.

Measures

Dependent variables. Dependent variables in this study are defined as maintenance costs for a foster child during the child's first spell in care. It is important to note that the distribution of costs was quite skewed. In particular, a substantial proportion of the children did not have any costs, and among those who did have costs, the costs data had a heavily skewed distribution. To handle these issues, I conducted separate

analyses using two separate models with different sample populations: one model for all foster children, and the other model for children who had foster care costs. Thus, two dependent variables were employed: 1) for all foster children, a binary variable measuring whether the child had any costs; and 2) for children who had costs, a continuous variable measuring the natural logarithms[5] of average monthly costs for each child for whom caregivers received foster care maintenance payments.

First, a binary outcome variable was constructed to capture whether or not foster children were in a paid placement in foster care. The full sample of foster children (N=32,978) was included in the analysis for this variable. If any foster care maintenance payments were paid on behalf of a child during the child's first spell in care, the case was coded 1; if the child did not have any payment records, then the case was coded 0. There are no maintenance costs for a child placed with an unlicensed relative in kinship care, and so if the foster child was placed only in the home of unlicensed relatives, the case belonged to the no-cost group. If, on the other hand, the foster child was placed in the home of a relative who had a foster care license and received foster care payments, the placement was considered a paid placement. Also, if a foster child was ever placed in unlicensed relative home but also placed in a paid living arrangement, the case belonged to the cost group.

The second variable was constructed to capture average monthly costs of out-of-home care. Only foster children who had payment records (n=23,519) were included in the analysis for this variable. The costs used in this analysis were foster care maintenance costs, which are expenditures associated with providing licensed care for a child in foster

[5] The natural logarithm is the logarithm to the base *e*, where *e* is an irrational constant approximately equal to 2.718.

care. Only costs incurred during the first spell in care were tracked. Funding to pay these maintenance costs is drawn from federal IV-E reimbursement, state and county foster home funds, and some TANF funds. Average monthly costs of out-of-home care were calculated as follows: First, I totaled those expenditures for each child to calculate the monthly individual cost of care. Then, I calculated per diem rates by dividing each child's total costs by his or her length of stay during the first spell in care. Finally, I converted per diem rates into monthly cost with the following calculation:

(per diem rates*365.25)/12.

Thus, the monthly costs are average costs by month for children in their first spell of out-of-home care. The distribution of the average monthly costs is positively skewed. That is, it has longer right tail in its distribution, while the mass of the distribution is concentrated on the left, which has more low values. In order to reduce the impact of outliers, I transformed the values of average monthly costs by taking a natural logarithm, which is a popular method for dealing with the related problems of skewness and heteroscedasticity (Knapp et al., 2002).

Independent variables.

Child-level predictors. All of the variables measuring child characteristics were obtained from the UNC longitudinal child welfare data file. To estimate the association between foster children's demographic characteristics and their foster care costs, I used the indicators of gender, age, race/ethnicity, and disability. Gender was measured as a dichotomous variable with the categories of male and female. Male was used as the reference group for multivariate analyses. Age in this study is the age of the foster child on the date s/he entered foster care for the first time. This variable was used as a

continuous variable for multivariate analyses. Race and ethnicity of the foster child was separated into three categories: White non-Hispanic, African-American non-Hispanic, and Hispanic and other origins. White was used as the reference group in the multivariate analysis. In regard to disability, physical, mental, emotional, and vision/hearing disabilities were considered. Any child who had one or more disabilities among those categories was considered disabled. This variable was dichotomized and the results were shown for disabled children in relation to the reference group, namely, children who did not have any disabilities.

To examine the extent to which prior maltreatment history influences costs for out-of-home care, I used reason for entry into foster care as an indicator, and two separate dichotomous variables were created for abuse and neglect, respectively. When a foster child had experienced physical and/or sexual abuse before entering foster care and the experience was identified as reason for placement, the case was coded 1, and children without abuse were considered as the reference group for multivariate analyses. Similarly, the second measure of reason for placement captured whether or not the foster child had experienced neglect before being placed in care, and children who did not experience neglect were considered as reference group for multivariate analyses. These measures were assessed independently, so that a child with both abuse and neglect would be captured separately by both variables.

To gauge the relationship between foster care experiences and foster care costs, I used several indicators. First, the type of initial placement in foster care was captured by six categories: placement with relatives, placed in foster home, placed in residential

group home,[6] placed in treatment group home,[7] placed in an emergency shelter, and all other types of placement. Placement with relatives indicates placement of the foster child with relatives who do not have a foster care license. Placed in residential group home and placed in treatment group home both indicate that the children were placed in a residential setting, but a treatment group home provides more intensive services than a residential group home and is usually reserved for children who need special care, such as those with a disability or a history of substance abuse. An emergency shelter is a residential facility which provides emergency and temporary care. A second indicator was number of placement moves, which was measured by counting how many times the foster child moved placements in the first spell. This indicator was dichotomized into 3 or more placement moves and 2 or less placement moves; 2 or less placement moves was the reference group. The third indicator was percentage of duration of non-family settings during stay in out-of-home care, which was calculated by dividing the number of days the child spent in non-family living arrangements by the total length of stay in out-of-home care. This was considered as a continuous variable.

To estimate how foster care costs vary by reason for exit from foster care, the following categories were specified: reunification with parents or primary caretakers, guardianship with a relative or court approved caretaker, adoption, custody with non-removal caretaker or court-approved caretaker, emancipation when the foster child

[6] This category included two living arrangements: small residential group home for nine or fewer children, and large residential group facility for ten or more children (NC-DHHS, 2007). A residential group home provides 24-hour full-time care, but excludes treatment programs administered by hospitals or which operate under the administration and program standards of the NC Division of Mental Health, Developmental Disabilities, and Substance Abuse Services.

[7] This category also included two living arrangements: small treatment group home for nine or fewer children, and large treatment group facility for ten or more children (NC-DHHS, 2007). A treatment group home provides 24-hour residential treatment for children who need care, treatment, habilitation or rehabilitation because of mental illness, mental retardation or substance abuse.

reached age 18 or older, and other termination reasons such as runaway, transfer to another agency or state, or death of child. Reunification with parents or primary caretakers was specified as the reference group for multivariate analyses.

County-level predictors. To estimate the effect of the local county's foster care service capacity on foster care costs, several county-level aggregated indicators were used. One indicator was size. North Carolina's 100 counties have been divided in three size categories: large (n=10), medium (n=40), and small (n=50). Designations are mainly based on population and tax base, among other factors (Duncan et al., 2010). For multivariate analyses, the county size was dichotomized. Large and medium counties were combined into one group, and this combined group was used as the reference group. Thus, results were discussed for small counties in relation to large and medium counties. The percentage of the county's population age 19 and under was calculated by dividing each county's population age 19 and under by the county's total population. The data were obtained from the U.S. Census Bureau and were provided for each year. As the estimates varied by year, I averaged the information for all years of the study for each county. A second county-level indicator was poverty. Poverty information was obtained from the U.S. Census Bureau's Small Area Income Poverty Estimates (SAIPE) data, which provides estimates of the number of individuals living in poverty in each county (U. S. Census Bureau, 2010). As the poverty numbers also varied by year, I used the average of the each year's percentage for each county.

To assess how a county agency used foster care placements, I constructed three measures based on information from the UNC longitudinal child welfare data. Specifically, I calculated the county's percentage of children ever placed in a non-family

living arrangement by dividing the number of children who were ever in non-family placements by the total number of foster children for each county. Non-family placements include residential or treatment group homes, residential schools, and emergency shelters. Similarly, the county's percentage of children ever placed in residential treatment facilities was calculated by dividing the number of children ever placed in a residential treatment facility by the foster care population in each county. Finally, the county's percentage of children ever placed with relatives was calculated using the same logic as above, that is, the number of children ever placed with relatives was divided by the total number of foster children for each county. In addition, the county's percentage of foster children who did not have any foster care payments was also estimated by dividing the number of children without costs by all foster children in each county. All variables based on percentages were considered as continuous variables.

To estimate each county's capacity for foster care services, I measured the number of beds contained in each county. Bed counts for each year during the study period were averaged, and the mean value was used as a county-level indicator. A measure of county participation in the IV-E waiver program was used to assess whether a county's child welfare agency had a history of involvement in child welfare reform efforts and whether the participation affected foster care costs. That variable was dichotomized into the counties which had ever participated in the IV-E waiver demonstrations and the counties without IV-E waivers. Counties without waivers were specified as the reference group for multivariate analyses.

Data Analysis Procedures

Multilevel modeling. The primary purpose of this study was to investigate foster

children's individual out-of-home costs from their first entry into care to their exit from this first spell of care, considering both child-level and county-level factors. Interactions between child-level and county-level factors (i.e., cross-level interactions) were also examined in order to assess whether county-level variables moderate associations at the child level. This kind of multilevel data can be analyzed using single-level analysis methods (e.g., ordinary least squares regression or logistic regression), but problems arise when such methods are used. Specifically, there are three major difficulties in using single-level analysis methods for multilevel data: 1) aggregation bias, 2) misestimated standard errors, and 3) heterogeneity of regression (Raudenbush & Bryk, 2002). Aggregation bias occurs when a variable takes on different meanings and therefore may have different effects at different levels. Misestimated standard errors occur in clustered data whenever analysts fail to take into account dependence among individual responses within the same cluster—in this case, costs for foster children in a given county. Heterogeneity of regression occurs when the relationship between individual characteristics and outcomes varies across groups or areas.

These obstacles can be overcome with the use of multilevel modeling. Aggregation bias is avoided by facilitating a decomposition of any observed relationship between variables into different level components. Misestimation of standard error is also avoided because multilevel modeling incorporates a unique random effect for each organization unit; the variability in these random effects is taken into account to estimate standard errors. Multilevel modeling also resolves the problem of heterogeneity of regression by estimating a separate set of regression coefficients for each organizational unit and by then modeling variations among organizations in their sets of coefficients. In

fact, single-level analysis can be considered as one special case of the multilevel model in which the level-2 (i.e., county-level) variance equals zero, meaning that all the variability is individual and there is no inter-group variability. In sum, multilevel modeling enables researchers to model relationships within and between levels of data as well as to model cross-level interactions (Guo, 2005; Snijders & Bosker, 1999).

As a preliminary analysis before conducting multilevel analysis, I explored the extent to which counties vary in their costs in out-of-home care by using an unconditional random intercept model. This method provided useful preliminary information. Specifically, it provided a partitioning of the total variation in foster care costs into variation between and within counties, and it also provided information on the degree of dependence of the observations within each county, or the intra-class correlation (ICC).

Once the unconditional random intercept model was specified, I analyzed a main model that estimated the effects of level-1 and level-2 predictors on foster care costs. This main model provided an estimation of the direct effects of child-level and county-level predictors on the dependent variable. In addition, I estimated a random coefficient model to determine whether the coefficients for the child-level measures varied across counties. Finally, I estimated interaction effects by specifying cross-level interaction terms between child-level and county-level predictors while the main effects were consistent. Significant interactions suggested that the effects of child-level measures differ depending on county-level predictors. Each cross-level interaction was tested one at a time, by adding it to all main-effect variables in each model. Only significant interactions were retained and tested together along with the main effects in the final model. I further assessed the directions of significant moderator effects by probing simple

regression lines (Aiken, 1991; Tien, Sandler, MacKinnon, & Wolchik, 2004). I have provided graphical representations to visually show the interaction effects.

In this study, each predictor was centered around its grand mean to get precise estimation and help the model reach convergence. For this estimate I chose grand-mean centered rather than group-mean centered. While centering around the group (i.e., county) mean provides unbiased parameter estimates for the level-1 measures (i.e., child-level independent measures), the group-mean centering technique may simultaneously bias the effect of level-2 parameters (i.e., county-level independent measures), producing the effect of masking theoretically important compositional differences between counties (Ulmer & Johnson, 2004). Although grand-mean centering has a risk of introducing estimation bias in level-1 effect because it is a weighted combination of the between- and within-county effects, grand-mean centering is more appropriate when examining potentially important differences among counties.

Hierarchical generalized linear model and hierarchical linear model. Cost data for the study sample were complicated by three characteristics: (1) a non-ignorable proportion (28.7%) of zero values; (2) nonnegative values of foster care payments; and (3) a highly right-skewed distribution. These three complicating characteristics suggested that no simple parametric distribution was suitable for describing such complicated data. Instead, I chose an alternative method of analysis, which was to separately model the zeros and positive expenditures with two separate equations. The first of these equations was to consider the binary event of whether or not a foster child had any non-zero foster care costs; all children who entered foster care in the study period were included in this equation. The second equation was a linear function estimating the level of foster care

costs; only children who had positive foster care payments were included in this equation. In the second equation, the dollar amount of payments was transformed to a log scale, which is usually helpful to shorten the long right tail, lessen heteroscedasticity, and decrease the influence of outliers.

Applying this approach to a multilevel modeling context, I conducted two different multilevel analyses: (1) a multilevel logistic model (also known as hierarchical generalized linear model (HGLM)) to examine the likelihood of having non-zero foster care costs with a dichotomous dependent variable, and (2) a multilevel linear model (also known as hierarchical linear model (HLM)) to estimate the amount of foster care costs (log costs) with a continuous dependent variable. Both dependent variables were estimated based on two levels of hierarchical structure, namely, individual-level and county-level factors.

PROC GLIMMIX in SAS 9.2 (SAS Institute, Cary, NC) was used to conduct multilevel logistic regression for the binary dependent variable. I used the Laplace method of estimation, as this numeric maximum likelihood method of estimation allows for the computation of likelihood estimates (Snijders & Bosker, 1999). And, I used PROC MIXED in the same statistical software to conduct HLM analysis for the continuous dependent variable.

Hierarchical generalized linear model. HGLM includes a special case that addresses the likelihood associated with binary dependent variables, such as multilevel logistic regression (Raudenbush & Bryk, 2002; Snijders & Bosker, 1999). Binary dependent variables may violate the assumptions of normality, linearity, and homoscedasticity presupposed by ordinary least squares or hierarchical linear modeling

(HLM) (Long, 1997; Raudenbush & Bryk, 2002). Because binary dependent variables were restricted to one of two outcomes (in this study, 0 = no cost, 1 = costs), outcomes had non-normal and non-symmetric distributions. HGLMs handle this issue by specifying one of several link functions to transform the outcome such that the dependent variable is substituted so that it adheres to the assumptions of the linear model (Raudenbush & Bryk, 2002). For binary outcomes, it is common to use a logit link function to serve as the distribution of the dependent variable, and the interpretation of results is similar to that found in conventional logistic regression where the estimates represent the predicted log-odds which can be converted into an odds ratio by taking the exponent of the estimate. HGLM can also account for the lack of independence across levels of nested data (i.e., foster children nested within counties) with the control of clustering by including county-level random effects. It expands the logistic regression model by estimating the influence of child-level and county-level characteristics on the odds of having foster care costs as well as modeling joint effects with interaction terms.

The initial step when estimating a multilevel model with a dichotomous outcome requires the estimation of empty models that include only the outcome measures with a random intercept. This process produces the proportion of variance explained at each level. It allows for the calculation of ICC to determine whether the proportion of variance in the model is attributable to differences between counties. A low ICC indicates little variation in the likelihood of foster care costs across counties compared to the variation in the likelihood of foster care costs within counties. Although Larsen and Merlo (2005) argued that ICC may be uninformative in multilevel logistic regression, and graphing probabilities as an alternative is recommended (Raudenbush & Bryk, 2002), the ICC

formula modified by Snijders and Bosker (1999) has been widely used. They suggested that ICC can be calculated by the following formula:

$\rho = \frac{\psi}{\psi + \pi^2/3}$, where $\pi = 3.142$

and ψ is the variance of level-2 random effects.

Main models were then run to examine the effect of child-level and county-level predictors on the likelihood of foster care costs. Specifically, equations for the main model for HGLM can be written as follows:

Level-1 equation:

Gender – Female (FEMALE)

Race/Ethnicity – non-Hispanic African American (BLACK)

Race/Ethnicity – Hispanic and other origins (HISOTH)

Age at entry – Ages 6-12 (AGE612)

Age at entry – Age 13 or older (AGE13)

Physical/sexual abuse before foster care (PREABUSE)

Neglect before foster care (PREANEGT)

Disability (DISAB)

3 or more placement moves (PMN3)

Percentage of duration of non-family placements (DNFP)

Exit reason – Guardianship (GUARD)

Exit reason – Adoption (ADOPT)

Exit reason – Custody (CUSTD)

Exit reason – Emancipation (EMANC)

Exit reason – All other (OTHEXT)

$\eta_{ij} = \beta_{0j} + \beta_{1j}(FEMALE)_{ij} + \beta_{2j}(BLACK)_{ij} + \beta_{3j}(HISOTH)_{ij} + \beta_{4j}(AGE612)_{ij} + \beta_{5j}(AGE13)_{ij}$ $+ \beta_{6j}(PREABUSE)_{ij} + \beta_{7j}(PREANEGT)_{ij} + \beta_{8j}(DISAB)_{ij} + \beta_{9j}(PMN3)_{ij} + \beta_{10j}(DNFP)_{ij} +$ $\beta_{11j}(GUARD)_{ij} + \beta_{12j}(ADOPT)_{ij} + \beta_{13j}(CUSTD)_{ij} + \beta_{14j}(EMANC)_{ij} + \beta_{15j}(OTHEXT)_{ij}$

The parameters were interpreted as follows: β_{0j} is the random intercept; $\beta_{1j}, \ldots, \beta_{15j}$ are the effects of each level-1 predictor within county *j*, which are held to be a constant value in the level-2 equation; and η_{ij} is the log-odds of foster care costs for child *i* in county *j*. In multilevel logistic analysis, the level-1 equation does not contain an error term. This is because the error variance is now assumed to follow a standard logistic distribution with a mean 0 and variance $\pi^2/3$.

Level-2 equation:

County size (SMALL)

Percentage of Population Age 19 or Less (AGE19P)

Percentage of Poverty (POVP)

Percentage Ever in Non-Family Placement (NFAMP)

Percentage Ever in a Residential Treatment Facility (BFACP)

Percentage Ever Placed with Relatives (RELP)

Number of Beds (FACBED)

IV-E waiver participation (IVE)

$\beta_{0j} = \gamma_{00} + \gamma_{01}(SMALL)_j + \gamma_{02}(AGE19P)_j + \gamma_{03}(POVP)_j + \gamma_{04}(NFAMP)_j + \gamma_{05}(BFACP)_j +$ $\gamma_{06}(RELP)_j + \gamma_{07}(FACBED)_j + \gamma_{08}(IVE)_j + u_{0j}$

$\beta_{1j} = \gamma_{10}$

$\beta_{2j} = \gamma_{20}$

.
.
.

$\beta_{15j} = \gamma_{150}$

γ_{00} is the predicted value for β_{0j} where level-2 predictors are zero, and it is the intercept for the overall model equation in the combined form; γ_{01},..., γ_{08} are the expected increases in β_{0j} per one-unit increase in each level-2 predictor, and they are the main effect of each level-2 predictor on the dependent variable in the combined form; γ_{10},..., γ_{150} are the main effect of level-1 predictors on the dependent variable; and u_{0j} is the random effect for β_{0j} that remains after prediction by level-2 variables, and it is assumed to be normally distributed with a mean of zero and independently estimated variance.

Combined form:

$$\eta_{ij} = \gamma_{00} + \gamma_{01}(SMALL)_j + \gamma_{02}(AGE19P)_j + \gamma_{03}(POVP)_j + \gamma_{04}(NFAMP)_j + \gamma_{05}(BFACP)_j + \gamma_{06}(RELP)_j + \gamma_{07}(FACBED)_j + \gamma_{08}(IVE)_j + \gamma_{10}(FEMALE)_{ij} + \gamma_{20}(BLACK)_{ij} + \gamma_{30}(HISOTH)_{ij} + \gamma_{40}(AGE612)_{ij} + \gamma_{50}(AGE13)_{ij} + \gamma_{60}(PREABUSE)_{ij} + \gamma_{70}(PREANEGT)_{ij} + \gamma_{80}(DISAB)_{ij} + \gamma_{90}(PMN3)_{ij} + \gamma_{100}(DNFP)_{ij} + \gamma_{110}(GUARD)_{ij} + \gamma_{120}(ADOPT)_{ij} + \gamma_{130}(CUSTD)_{ij} + \gamma_{140}(EMANC)_{ij} + \gamma_{150}(OTHEXT)_{ij} + u_{0j}$$

Link function:

$$\eta_{ij} = \text{logit}(\mu) = \ln\left(\frac{\mu_{ij}}{1-\mu_{ij}}\right)$$

where η_{ij} is the log-odds of foster care costs, μ is the probability for dependent variable=1, and 1- μ is the probability for dependent variable=0.

Moderator effects can be assessed by examining the slope of the outcome at different levels of the moderator variables. To examine how the effects of level-1 predictors on the likelihood of foster care costs vary depending on level-2 predictors, the cross-level interaction terms were added to the main model. The level-1 equation was the

same as the level-1 equation in the main model above. Interaction—that is, whether a within-county effect is weaker or stronger in some counties than other counties—was assessed by including a level-2 predictor of slopes. The cross-level interaction between county size and child's number of placement moves can be specified in the combined form as follows:

$$\eta_{ij} = \gamma_{00} + \gamma_{01}(\text{SMALL})_j + \gamma_{02}(\text{AGE19P})_j + \gamma_{03}(\text{POVP})_j + \gamma_{04}(\text{NFAMP})_j + \gamma_{05}(\text{BFACP})_j + \gamma_{06}(\text{RELP})_j + \gamma_{07}(\text{FACBED})_j + \gamma_{08}(\text{IVE})_j + \gamma_{10}(\text{FEMALE})_{ij} + \gamma_{20}(\text{BLACK})_{ij} + \gamma_{30}(\text{HISOTH})_{ij} + \gamma_{40}(\text{AGE612})_{ij} + \gamma_{50}(\text{AGE13})_{ij} + \gamma_{60}(\text{PREABUSE})_{ij} + \gamma_{70}(\text{PREANEGT})_{ij} + \gamma_{80}(\text{DISAB})_{ij} + \gamma_{90}(\text{PMN3})_{ij} + \gamma_{100}(\text{DNFP})_{ij} + \gamma_{110}(\text{GUARD})_{ij} + \gamma_{120}(\text{ADOPT})_{ij} + \gamma_{130}(\text{CUSTD})_{ij} + \gamma_{140}(\text{EMANC})_{ij} + \gamma_{150}(\text{OTHEXT})_{ij} + \gamma_{91}(\text{SMALL* PMN3}) + u_{0j}$$

where γ_{91} is the joint effect of the cross-level interaction.

Hierarchical linear model. HLM analysis has been applied in numerous areas of the social sciences, as it can yield more precise parameter estimates and standard errors when data are nested. HLM analysis is based on the same responses and distributional assumptions as the conventional regression analysis. In this step, multilevel modeling of the continuous, normally distributed logarithm of average monthly costs in out-of-home care was employed. Even though children without foster care costs were excluded from the HLM analysis, the costs data still had a heavily skewed distribution; that is, only a few children had very high costs whereas costs for the majority of the children were low. In the case of a positively skewed distribution with a long right tail, the residuals of the regression model are frequently non-normal and heteroscedastic. The violation of the assumption of normal and homoscedastic residuals may result in misestimation of standard errors and the calculation of wrong confidence intervals (Kilian, Matschinger,

Löeffler, Roick, & Angermeyer, 2002).

The log-transformation of the dependent variable is often employed to obtain approximately normal and homoscedastic residuals. Because the dependent variable has been transformed into natural logarithmic form, the coefficients cannot be interpreted directly as a change in the actual amount, but instead require exponential transformation. In other words, the parameter estimates resulting from a log-transformed cost model indicate the change of the natural logarithm of foster care costs resulting from a one-unit change of the independent variable (Kilian et al., 2002). Effect ratios through the exponentiation of the regression parameter given by exp(β) show values which indicate the proportional change of the original cost variable due to a unit change of the independent variable (Knapp et al., 2002).

As the first step in my analysis, I ran the random-effects ANOVA model in which the intercept only was allowed to vary at random at the higher level to estimate variance components. With the proportion of variance explained at each level, the ICC was calculated, which provides the degree of dependence in the data and the strength of the effect of the nesting structure. Main models were then run to examine the effect of child-level and county-level predictors on average monthly foster care costs. While all level-1 and level-2 predictors in the main model of HGLM analysis were kept, I added an additional variable (i.e., the percentage of duration of non-family placements) as a random slope from level-1 predictors. In the covariance estimates, a significant random component for the intercept indicates that counties differ in their mean of average monthly costs for out-of-home care even after controlling for the effect of the random variable. The significance of the additional random variable suggests that the effect of the

variable is not homogeneous over all counties (Raudenbush & Bryk, 2002).[8] I also added a level-1 predictor, initial placement type (i.e., foster home (FOSTER), residential group home (RESID), treatment group home (TREAT), emergency shelter (SHELT) or all other placements (OTHPL)). And, another level-2 predictor, the percentage of children in a county who did not have foster care costs (NOCSTP), was added to estimate the fixed effect of that variable on foster care costs after controlling for all other predictors.

Taken together, equations for the main model for HLM can be written as follows:

Level-1 equation:

$$Y_{ij} = \beta_{0j} + \beta_{1j}(FEMALE)_{ij} + \beta_{2j}(BLACK)_{ij} + \beta_{3j}(HISOTH)_{ij} + \beta_{4j}(AGE612)_{ij} + \beta_{5j}(AGE13)_{ij} + \beta_{6j}(PREABUSE)_{ij} + \beta_{7j}(PREANEGT)_{ij} + \beta_{8j}(DISAB)_{ij} + \beta_{9j}(FOSTER)_{ij} + \beta_{10j}(RESID)_{ij} + \beta_{11j}(TREAT)_{ij} + \beta_{12j}(SHELT)_{ij} + \beta_{13j}(OTHPL)_{ij} + \beta_{14j}(PMN3)_{ij} + \beta_{15j}(DNFP)_{ij} + \beta_{16j}(GUARD)_{ij} + \beta_{17j}(ADOPT)_{ij} + \beta_{18j}(CUSTD)_{ij} + \beta_{19j}(EMANC)_{ij} + \beta_{20j}(OTHEXT) + r_{ij}$$

Level-2 equation:

$$\beta_{0j} = \gamma_{00} + \gamma_{01}(SMALL)_j + \gamma_{02}(AGE19P)_j + \gamma_{03}(POVP)_j + \gamma_{04}(NFAMP)_j + \gamma_{05}(BFACP)_j + \gamma_{06}(RELP)_j + \gamma_{07}(FACBED)_j + \gamma_{08}(IVE)_j + \gamma_{09}(NOCSTP)_j + u_{0j}$$

$$\beta_{1j} = \gamma_{10}$$

$$\beta_{2j} = \gamma_{20}$$

.
.

$$\beta_{15j} = \gamma_{150} + u_{1j}$$

.
.

$$\beta_{20j} = \gamma_{200}$$

Combined equation:

[8] In addition to a simple method which checks the significance of the ratio of the estimated variance of a random component, the following three methods are often used to decide whether to include appropriate random effects: likelihood ratio test (deviance test); comparison of models using Akaike Information Criterion (AIC) or Bayesian Information Criterion (BIC); and a multiparameter test (Guo, 2005).

$$Y_{ij} = [\gamma_{00} + \gamma_{01}(SMALL)_j + \gamma_{02}(AGE19P)_j + \gamma_{03}(POVP)_j + \gamma_{04}(NFAMP)_j + \gamma_{05}(BFACP)_j + \gamma_{06}(RELP)_j + \gamma_{07}(FACBED)_j + \gamma_{08}(IVE)_j + \gamma_{09}(NOCSTP)_j + \gamma_{10}(FEMALE)_{ij} + \gamma_{20}(BLACK)_{ij} + \gamma_{30}(HISOTH)_{ij} + \gamma_{40}(AGE612)_{ij} + \gamma_{50}(AGE13)_{ij} + \gamma_{60}(PREABUSE)_{ij} + \gamma_{70}(PREANEGT)_{ij} + \gamma_{80}(DISAB)_{ij} + \gamma_{90}(FOSTER)_{ij} + \gamma_{100}(RESID)_{ij} + \gamma_{110}(TREAT)_{ij} + \gamma_{120}(SHELT)_{ij} + \gamma_{130}(OTHPL)_{ij} + \gamma_{140}(PMN3)_{ij} + \gamma_{150}(DNFP)_{ij} + \gamma_{160}(GUARD)_{ij} + \gamma_{170}(ADOPT)_{ij} + \gamma_{180}(CUSTD)_{ij} + \gamma_{190}(EMANC)_{ij} + \gamma_{200}(OTHEXT)_{ij}] + [u_{0j} + u_{1j}(DNFP)] + r_{ij}$$

where Y_{ij} is the log of average monthly foster care costs, u_{0j} is random effect for intercepts, u_{1j} is random effect for the slopes,[9] and r_{ij} is random effect for the children within counties.

To investigate whether level-2 predictors moderated the effects of level-1 predictors on foster care costs, I also investigated the potential effects of cross-level interactions using HLM analysis. For example, the main model plus the cross-level interaction between the child's number of placement moves and county percentage of children who were ever placed with relatives can be specified in the combined form as follows:

$$Y_{ij} = [\gamma_{00} + \gamma_{01}(SMALL)_j + \gamma_{02}(AGE19P)_j + \gamma_{03}(POVP)_j + \gamma_{04}(NFAMP)_j + \gamma_{05}(BFACP)_j + \gamma_{06}(RELP)_j + \gamma_{07}(FACBED)_j + \gamma_{08}(IVE)_j + \gamma_{09}(NOCSTP)_j + \gamma_{10}(FEMALE)_{ij} + \gamma_{20}(BLACK)_{ij} + \gamma_{30}(HISOTH)_{ij} + \gamma_{40}(AGE612)_{ij} + \gamma_{50}(AGE13)_{ij} + \gamma_{60}(PREABUSE)_{ij} + \gamma_{70}(PREANEGT)_{ij} + \gamma_{80}(DISAB)_{ij} + \gamma_{90}(FOSTER)_{ij} + \gamma_{100}(RESID)_{ij} + \gamma_{110}(TREAT)_{ij} + \gamma_{120}(SHELT)_{ij} + \gamma_{130}(OTHPL)_{ij} + \gamma_{140}(PMN3)_{ij} + \gamma_{150}(DNFP)_{ij} + \gamma_{160}(GUARD)_{ij} +$$

[9] If the variance component associated with the added u_{1j} term is significant ($p < .05$) according to a chi-square goodness of fit test, then this random effect is retained in the main model.

$\gamma_{170}(\text{ADOPT})_{ij} + \gamma_{180}(\text{CUSTD})_{ij} + \gamma_{190}(\text{EMANC})_{ij} + \gamma_{200}(\text{OTHEXT})_{ij} + \gamma_{146}(\text{RELP*}$ $\text{PMN3})_{ij}\ ] + [u_{0j} + u_{1j}\,(\text{DNFP})] + r_{ij}$

Model diagnostics. HLM has the following key assumptions: 1) level-1 residuals are independent, homoscedastic, and normally distributed, 2) level-2 random effects are independent over level-2 units, homoscedastic, and have multivariate normal distribution. and 3) level-1 residuals are uncorrelated with level-2 random effects (Snijders & Bosker, 1999). In the case of the log or any other transformed dependent variable, it is highly recommended to perform one additional set of tasks, in order to determine if residuals are normally distributed at the child- and the county levels. I applied graphical approaches to test if my HLM models meet HLM assumptions.

CHAPTER 5

RESULTS

Preliminary Analysis

The study population consists of children who had foster care payments made on their behalf and others who did not have foster care costs. A descriptive analysis provided an in-depth comparison between the cost and no-cost groups as well as the characteristics of all foster children and counties in North Carolina. Table 2 presents descriptive statistics for child and county characteristics.

Child characteristics. There were approximately equal numbers of male and female children in the sample, with 16,630 females (50.4%) and 16,348 males (49.6%). The distribution of females and males was also nearly equal in the cost group and the no-cost group. The sample included children of a variety of races and ethnicities: White non-Hispanic (48.2%), African-American non-Hispanic (37.4%), and Hispanic and Other (14.5%). While the percentage of children who were Hispanic and Other was 11.3% in the no-cost group, that percentage was 15.7% in the cost group.

Table 2. Descriptive Statistics

			All NC Foster Children (N=32978)		No Foster Care Costs (n=9459)		Foster Care Costs (n=23519)	
			Mean or Number	SD or Percentage	Mean or Number	SD or Percentage	Mean or Number	SD or Percentage
County	County Size	Large	12784	38.8%	3433	36.3%	9351	39.8%
		Medium	14316	43.4%	4099	43.3%	10217	43.4%
		Small	5878	17.8%	1927	20.4%	3951	16.8%
	% of Population Age 19 or Less		27.1	2.5	27.1	2.6	27.0	2.4
	% of Poverty		14.2	3.7	14.5	3.8	14.0	3.7
	Number of Beds		1120.5	1387.5	1052.9	1328.3	1147.7	1409.7
	IV-E Waiver Participation		19646	59.6%	5327	56.3%	14319	60.9%
Child	Gender	Male	16348	49.6%	4628	48.9%	11720	49.8%
		Female	16630	50.4%	4831	51.1%	11799	50.2%
	Race/Ethnicity	White	15887	48.2%	4684	49.5%	11203	47.6%
		Black	12320	37.4%	3703	39.2%	8617	36.6%
		Hispanic & Other	4771	14.5%	1072	11.3%	3699	15.7%
	Age at Entry	Age 5 or less	15923	48.3%	4647	49.2%	11276	47.9%
		Ages 6-12	9509	28.8%	3085	32.6%	6424	27.3%
		Age 13 or older	7540	22.9%	1721	18.2%	5819	24.7%
	Physical/Sexual Abuse Before Foster Care		4331	13.1%	1193	12.6%	3138	13.3%
	Neglect Before Foster Care		26404	80.1%	7907	83.6%	18497	78.7%
	Disability		3101	9.4%	727	7.7%	2374	10.1%
	Length of Stay in Foster Care, in Days		558.1	541.3	330.4	336.9	649.6	579.6
	Number of Placement Moves	2 or Less	24189	73.4%	9051	95.7%	15138	64.4%
		3 or More	8789	26.7%	408	4.3%	8381	35.6%
	Exit Reason	Reunification	13059	39.6%	3428	36.2%	9631	41.0%
		Guardianship	4279	13.0%	2002	21.2%	2277	9.7%
		Adoption	7099	21.5%	1122	11.9%	5977	25.4%
		Custody	4152	12.6%	2016	21.3%	2136	9.1%
		Emancipation	1734	5.3%	132	1.4%	1602	6.8%
		All others	2655	8.1%	759	8.0%	1896	8.1%

Nearly half (48.3%) of the children in the full sample were removed from their home before the age of 6; 28.8% were removed between the ages of 6 and 12; and 22.9% were removed at age 13 or later. Among children in the no-cost group, 49.2% were removed from the home before the age of 6, 32.6% were removed between the ages of 6 and 12, and 18.2% were removed at age 13 or later. For children in the cost group, 47.9% entered foster care before the age of 6, 27.3% were removed between ages 6 and 12; and 24.7% entered care at age 13 or older. Approximately 9.4% (n=3,101) of the overall sample had one or more disabilities. While the percentage of disabled children in the no-cost group was 7.7% (n=727), 10.1% of the children in the cost group had disabilities.

Overall, the majority (80.1%) of the children in the sample had experienced neglect, while 13.1% had been physically and/or sexually abused. While the percentage of children who experienced abuse was similar for both the cost and non-cost groups, the percentage of those who had experienced neglect was 83.6% for the no-cost group and 78.7% for the cost group. Overall, 26.7% of the children experienced three or more placement moves. Among children in the no-cost group, only 4.3% experienced three or more placement moves; in the cost group, 35.6% moved placements three or more times.

In terms of reason for exit from foster care, 39.6% of the children were reunified with their birth families and 21.5% were adopted. About 13.0% exited foster care for guardianship, and another 12.6% exited foster care to custody with a non-removal parent, relative, or court-approved caretaker. Among the children with no costs, 36.2% were reunified, 11.9% were adopted, 21.2% exited foster care for guardianship, and 21.3% exited foster care to custody. Among the children with costs, 41.0% were reunified, 25.4% were adopted, 9.7% exited foster care for guardianship, and 9.1% exited foster care to

custody.

The mean length of stay in foster care was 558 days and the median was 396 days. For children with no foster care costs, the mean was 330 days and the median was 250 days, while those with costs had a mean of 650 days and a median of 504 days. About 14.0% of the children stayed in out-of-home care for three or more years:[10] 3.5% for the no-cost group and 18.3% for the cost group. Length of stay varied by county size. Specifically, length of stay increased with county size. In large counties, the mean and the median of length of stay were 549 days and 432 days, respectively; in the no-cost group, the mean and median were 382 days and 287 days, while in the cost group the mean and median were 716 days and 579 days. In medium counties, the mean and median length of stay were 517 days and 358 days; in the no-cost group the mean and median were 293 days and 223 days, while for the cost group the mean and median were 608 days and 449 days. In small counties, the mean and median were 509 days and 352 days; in the no-cost group, the mean and median were 319 days and 244 days, while for the cost group the mean and median were 602 days and 455 days.

Overall, the mean of average monthly costs was $541.82 and the median was $347.18. The mean and median of average monthly costs varied by the child's age at entry. For children who entered care before age 6, the mean was $337.20 and the median was $309.25; for children who entered between ages 6 and 12, the mean and median were $580.74 and $366.61; and for children who entered at age 13 or older, the mean and median were $895.37 and $458.74. The median of average monthly costs differed only slightly according to county size: $357.14 for large counties, $344.05 for medium

[10] If foster children were still in care on October 31, 2010, the length of stay in out-of-home care was calculated from the first day in foster care through that date.

counties, and $333.71 for small counties. Mean costs, however, varied quite a bit by county size. Mean costs were highest in small counties, at $596.33, and lowest in medium counties, at $507.42. In large counties the mean was $556.36.

County characteristics. The sample included 12,784 foster children in large counties (38.8% of the overall sample), 14,316 in medium counties (43.4%), and 5,878 in small counties (17.8%). Among children in the no-cost group, 36.3% lived in large counties, 43.3% lived in medium counties, and 20.4% lived in small counties, while for the cost group, 39.8% lived in large counties, 43.4% lived in medium counties, and 16.8% lived in small counties. The average percentage of children age 19 or younger living in the foster child's home county was 27.1% for the full sample, with similar percentages for both the cost and no-cost groups. The average percentage of poverty in the foster child's home county was 14.2% for the full sample, with similar percentages for both the cost and no-cost groups. There were 1,121 available beds in the foster child's home county, on average, for the full sample: 1,053 beds for the no-cost group and 1,148 beds for the cost group. Approximately 59.6% of the full sample lived in counties which participated in IV-E waiver programs: 56.3% for the no-cost group and 60.9% for the cost group.

Multicollinearity. Before conducting multivariate analysis to answer the research questions, I examined two things to determine if issues of multicollinearity existed between independent variables at the child- or the county level: variance inflation factors (VIF), which is 1/tolerance, and correlation. All of the VIF values for independent variables were below the standard threshold of 10, and no high correlation above .80 was detected. Thus, there was little evidence of multicollinearity.

Hierarchical Generalized Linear Models (HGLM)

HGLM analysis estimated expected group membership (i.e., no-cost group vs. cost group) by considering the likelihood of belonging to each group given responses to a series of predictors. The likelihood was calculated by the log of the odds of belonging to a particular group, or the log of the ratio of the probability of belonging to that group versus not belonging.

Unconditional model. For all children (N=32,978) who entered foster care for the first time between state fiscal year (SFY) 2001 and SFY 2006, I first ran an unconditional random intercept null model (i.e., no independent variables) to partition the variance of the dichotomous dependent variable—that is, whether or not there were foster care costs—into individual- and county-level components. The variance of the random variable (in this model, the intercept) was significant with 0.834 (*SE*=0.049), and the predicted probability for an average county to pay for foster care costs was 0.697 (= 1/[1+*exp*(-.834)]). The result indicated that a majority of foster children had foster care payments made on their behalf and that there were significant county differences in the propensity to have foster care costs.

To determine the amount of between-county variance in whether or not there were foster care costs, the intra-class correlation (ICC) was calculated from the variance components.[11] That is, $\tau_0^2 / (\tau_0^2 + 3.289) = 0.834 / (0.834 + 3.289) = 0.202$, where τ_0^2 is the variance of the level-2 residuals and 3.289 is the variance of the level-1 residuals, indicating that 20.2 % of the variance in the propensity toward foster care costs was due to county-level characteristics at the group level. This result suggests that counties might

[11] I followed Snijders and Bosker' method (1999), in which they kept the individual-level residual variance fixed to 3.289 ($=\pi^2/3=3.141^2/3$).

differ in the likelihood of paying foster care costs but that there is even more variation among children within a given county, as the variance component within counties was nearly four times the size of the variance component between counties.

Main HGLM model. To better understand variations in foster care costs, I next ran a main model, adding both individual-level and county-level factors. I employed the random intercept model in which the intercept only was included as a random variable. Table 3 presents the estimated coefficients and other statistics for the main conditional model. In particular, the odds ratios and significance for each predictor are reported for all HGLM results. Odds ratios are easily interpretable statistics that represent the increased or decreased likelihood of having foster care costs based on the magnitude of the odds ratio. Table 3 presents the effects of child- and county-level factors on the likelihood of foster care costs.

Child-level predictors. To examine Research Question 1, the following individual-level variables were used as level-1 predictors: the child's demographic characteristics (i.e., age at entry, gender, race/ethnicity, disability); reason for placement in out-of-home care (i.e., physical/sexual abuse, neglect); foster care experiences (i.e., first placement type in foster care, number of placement moves, and percentage of duration of non-family placements); and reason for exit from foster care.

Regarding the association between demographic characteristics and foster care costs, several predictors were significant at the .05 level, after controlling for other variables. For disability, the odds ratio ($exp(\beta)$) was 1.144, indicating that children who had disabilities were approximately 14.4% more likely to have foster care payments made on their behalf compared to children without disabilities ($exp(\beta) = 1.144$, $p < .01$).

Table 3. The Effects of Child-Level and County-Level Factors on the Likelihood of Foster Care Costs (HGLM)

Variable			HGLM				
			β	SE	95% CI		Exp(β)
Fixed Effects					Lower	Upper	
Intercept			1.272 ***	0.062	1.148	1.395	
County-Level	County Size	Small (Large & Medium = Reference)	-0.268 *	0.102	-0.471	-0.065	0.765
	% of Population Age 19 or Less		0.020	0.021	-0.021	0.062	1.020
	% of Poverty		-0.005	0.014	-0.033	0.024	0.995
	% Ever in Non-Family Placement		0.002	0.006	-0.010	0.014	1.002
	% Ever in a Residential Treatment Facility		-0.001	0.006	-0.012	0.011	0.999
	% Ever Placed with Relatives		-0.032 ***	0.005	-0.043	-0.022	0.968
	Number of Beds		0.000	0.000	0.000	0.000	1.000
	IV-E Waiver Participation	Yes (No=Reference)	0.041	0.106	-0.170	0.252	1.042
Child-Level	Gender	Female (Male=Reference)	-0.024	0.027	-0.078	0.030	0.977
	Race/Ethnicity	Black (White=Reference)	-0.023	0.033	-0.088	0.042	0.977
		Hispanic & Other	0.453 ***	0.045	0.366	0.541	1.573
	Age at Entry		-0.012 ***	0.003	-0.018	-0.007	0.988
	Physical/Sexual Abuse Before Foster Care	Yes (No=Reference)	0.119 **	0.041	0.038	0.200	1.127
	Neglect Before Foster Care	Yes (No=Reference)	-0.311 ***	0.038	-0.385	-0.238	0.732
	Disability	Yes (No=Reference)	0.135 **	0.051	0.034	0.235	1.144
	Number of Placement Moves	3 or more Placement Moves (2 or less=Reference)	2.480 ***	0.054	2.373	2.587	11.944
	% of Duration of Non-Family Placements		0.004 ***	0.001	0.003	0.005	1.004
	Exit Reason	Guardianship (Reunification=Reference)	-1.125 ***	0.041	-1.206	-1.044	0.325

Child-Level (continued)		Adoption	0.331 ***	0.043	0.247	0.415	1.392
		Custody	-1.008 ***	0.041	-1.087	-0.928	0.365
		Emancipation	0.630 ***	0.102	0.431	0.829	1.877
		All Others	-0.455 ***	0.053	-0.558	-0.352	0.634
Random Effects (Variance Components)							
level-2 residual			0.147 ***				
Model Fit Statistics							
-2 Res Log Likelihood			32476.54				
AIC			32524.54				
BIC			32587.07				

SE = Standard error.
*$p < .05$. **$p < .01$. ***$p < .001$.
Note: SAS PROC GLIMMIX does not produce a coefficient for level-1 residuals.

Children of Hispanic and other origins were 57.3% more likely than non-Hispanic White children to have foster care costs ($exp(\beta) = 1.573$, $p < .001$), while the effect of being African-American was not statistically significant compared to that of White children. The odds ratio of child age at entry was 0.988, indicating that each unit increase in child age at entry decreased the average odds of having costs by 1.2% ($\exp(\beta) = 0.988$, $p < .001$). Children who were physically and/or sexually abused before entering care were 12.7% more likely to have costs compared to children who did not experience abuse before entering care ($\exp(\beta) = 1.127$, $p < .01$). Children who were neglected before entering care, however, were 26.8% less likely to have costs compared to children who did not experience neglect before entering care ($\exp(\beta) = 0.732$, $p < .001$).

All foster care experience-related predictors had significant effects on whether foster children had costs, after controlling for other variables. The odds ratio in the percentage of duration of non-family living placements in foster care was 1.004, indicating that each percentage point increase in duration of non-family placements among total stays in foster care increased the average odds of having costs by 0.4% ($\exp(\beta) = 1.004$, $p < .001$). Reason for exit from foster care also affected the likelihood of foster care costs. Children who exited foster care for guardianship with relatives or court-approved caretakers were 67.5% less likely to have costs compared to children reunified with parents or primary caretakers ($\exp(\beta) = 0.325$, $p < .001$). Children who exited for adoption were 39.2% more likely than reunified children to have costs ($\exp(\beta) = 1.392$, $p < .001$). Children who exited for custody with non-removal parents, relatives, or court-approved caretakers were 63.5% less likely than reunified children to have payments made on their behalf ($\exp(\beta) = 0.365$, $p < .001$). Children who stayed in foster care until

emancipation were 87.7% more likely to have costs compared to reunified children ($\exp(\beta) = 1.877$, $p < .001$).

County-level predictors. To address the Research Question 2, the following county-level variables as level-2 predictors were used: county size, percentage of county population age 19 or under, percentage of county population in poverty, percentage of children ever placed in non-family living arrangements, percentage of children ever placed in residential treatment facilities, percentage of children ever placed with relatives, number of beds, and county participation in IV-E waiver program.

Two of these county-level predictors were statistically significant in the main HGLM model. First, county size significantly affected the likelihood of foster care costs, holding all other variables constant. Specifically, children who lived in small counties were 23.5% less likely than children who lived in large and medium counties to have costs ($\exp(\beta) = 0.765$, $p < .05$). Second, for each one-unit increase in the county's percentage of children who were ever placed with relatives, the odds of having costs decreased by 3.2% ($\exp(\beta) = 0.968$, $p < .001$). Other county-level predictors did not have a significant influence on the likelihood of costs, after controlling for other variables.

Main HGLM with cross-level interaction model. To assess Research Question 3, that is, whether county-level variables moderated association at the child level, I added cross-level interaction terms, keeping all other predictors in the main model. First, each cross-level interaction was tested one at a time; that is, the model included all main effect variables plus the addition of one cross-level interaction. After individually testing cross-level interactions with the main effects, a total of three interactions between level-2 and level-1 predictors were significant at the 0.5 level. First, the effect of the child's number

of placement moves on the likelihood of costs differed depending on the size of the child's county (exp(β) = 0.647, $p < .001$). Second, the relationship between the child's percentage of duration of non-family living arrangements and the likelihood of costs varied as a function of county size (exp(β) = 1.005, $p < .01$). Third, the county's percentage of children ever placed with relatives moderated the influence of the child's number of placement moves on the likelihood of costs (exp(β) = 1.030, $p < .001$).

When I jointly tested the three cross-level interactions above with the main effects in one model, all of the main effects of the child- and county-level predictors that were significant in the main HGLM model remained significant, with almost identical odd ratios. All three interaction terms also remained significant.[12] Table 4 depicts the results from three cross-level interactions in addition to the main effects in the HGLM model.

[12] To evaluate the goodness of fit of the final model to data, the likelihood ratio test (also known as deviance test) was performed for each model by calculating chi-square statistics based on -2 log-likelihood values and the difference in degrees of freedom between models. Significant deviance differences suggested that the inclusion of interaction terms improved the models.

Table 4. HGLM with 3 Cross-Level Interactions

Variable			HGLM with 3 Cross-Level Interactions				
			β	SE	95% CI		Exp(β)
Fixed Effects					Lower	Upper	
Intercept			1.268 ***	0.062	1.144	1.392	
County-Level	County Size	Small (Large & Medium = Reference)	-0.369 ***	0.105	-0.578	-0.161	0.691
	% of Population Age 19 or Less		0.022	0.021	-0.019	0.064	1.023
	% of Poverty		-0.005	0.014	-0.034	0.023	0.995
	% Ever in Non-Family Placement		0.002	0.006	-0.010	0.014	1.002
	% Ever in a Residential Treatment Facility		-0.001	0.006	-0.012	0.011	0.999
	% Ever Placed with Relatives		-0.026 ***	0.006	-0.037	-0.015	0.975
	Number of Beds		0.000	0.000	0.000	0.000	1.000
	IV-E Waiver Participation	Yes (No=Reference)	0.042	0.106	-0.170	0.253	1.043
Child-Level	Gender	Female (Male=Reference)	-0.026	0.027	-0.079	0.028	0.975
	Race/Ethnicity	Black (White=Reference)	-0.026	0.033	-0.091	0.039	0.975
		Hispanic & Other	0.450 ***	0.045	0.363	0.538	1.569
	Age at Entry		-0.012 ***	0.003	-0.018	-0.007	0.988
	Physical/Sexual Abuse Before Foster Care	Yes (No=Reference)	0.120 **	0.041	0.039	0.201	1.128
	Neglect Before Foster Care	Yes (No=Reference)	-0.318 ***	0.038	-0.392	-0.244	0.728
	Disability	Yes (No=Reference)	0.136 **	0.051	0.036	0.236	1.146
	Number of Placement Moves	3 or more Placement Moves (2 or less=Reference)	2.465 ***	0.055	2.357	2.573	11.762
	% of Duration of Non-Family Placements		0.004 ***	0.001	0.003	0.005	1.004
	Exit Reason	Guardianship (Reunification=Reference)	-1.132 ***	0.041	-1.213	-1.051	0.322

Child-Level (continued)		Adoption	0.328 ***	0.043	0.244	0.412	1.388
		Custody	-1.013 ***	0.041	-1.093	-0.933	0.363
		Emancipation	0.626 ***	0.102	0.427	0.826	1.871
		All Others	-0.455 ***	0.053	-0.558	-0.352	0.635
Interaction (Cross-Level)	County Size*Child's Number of Placement Moves		-0.489 ***	0.129	-0.741	-0.237	0.613
	County Size*Child's % of Duration of Non-Family Placements		0.005 ***	0.002	0.002	0.009	1.005
	County % Ever Placed with Relatives*Child's Number of Placement Moves		0.031 ***	0.008	0.015	0.047	1.031
Random Effects (Variance Components)							
level-2 residual			0.148 ***				
Model Fit Statistics							
-2 Res Log Likelihood			32441.18				
AIC			32495.18				
BIC			32565.52				

SE = Standard error.
*$p < .05$. **$p < .01$. ***$p < .001$.
Note: SAS PROC GLIMMIX does not produce a coefficient for level-1 residuals.

To examine these significant cross-level interactions in detail, I estimated follow-up regressions for each of the three interactions. The first interaction for which I estimated a follow-up regression was the interaction between the child's number of placement moves and county size. Although there was a significant association in all counties between the child's number of placement moves and the likelihood of foster care costs, the effect of this interaction differed by county size ($\exp(\beta) = 0.613$, $p < .001$), as displayed in Figure 2. Specifically, while the likelihood of costs was similar across all county sizes, children in large and medium counties who had three or more placement moves showed a higher likelihood of costs than children in small counties who had three or more placement moves.

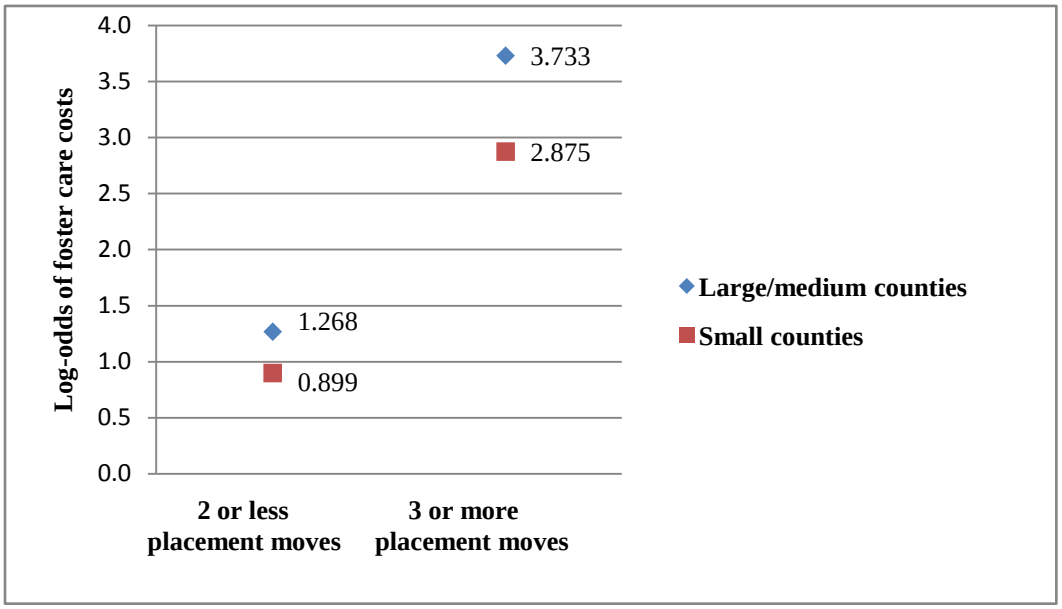


Figure 2. HLGM cross-level interaction between county size and child's number of placement moves

The second interaction for which I estimated a follow-up regression was the interaction between county size and child's percentage of duration of non-family placements. The likelihood of foster care costs generally increased as a child's percentage

of duration of non-family placements increased. However, a significant cross-level interaction between the percentage of duration of non-family placements and county size indicated that for children in small counties, as the percentage of duration of non-family placements increased, the increase in the likelihood of costs was steeper, compared to the trend line for children in large and medium counties (exp(β) = 1.005, $p < .001$). This regression is shown in Figure 3.

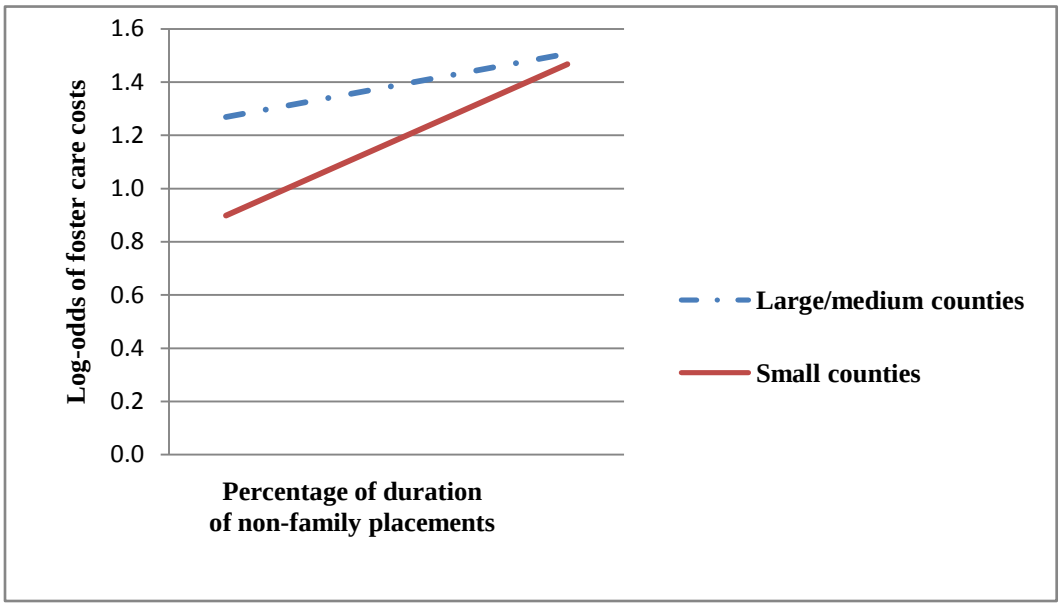


Figure 3. HGLM cross-level interaction between county size and child's percentage of duration of non-family placements

The third interaction for which I estimated a follow-up regression was the interaction between child's number of placement moves and county percentage of children ever placed with relatives. Although the number of placement moves was positively associated with the likelihood of costs in all counties, the effect differed depending on the county percentage of children ever placed with relatives (exp(β) = 1.031, $p < .001$). This regression is shown in Figure 4. Specifically, children who had two or less placement moves and lived in counties with a low percentage of relative

placements had a higher likelihood of costs, compared to that for children who had two or less placement moves in counties with a high percentage of relative placements. On the other hand, for children who had three or more placement moves, the likelihood of having foster care costs in counties with a high percentage of relative placements were slightly higher than the likelihood of costs in counties with a low percentage of relative placements. Taken together, for children living in counties that had a high percentage of relative placements, their frequency of placement moves had a greater effect on their likelihood of costs, compared to children living in counties with a low percentage of relative placements.

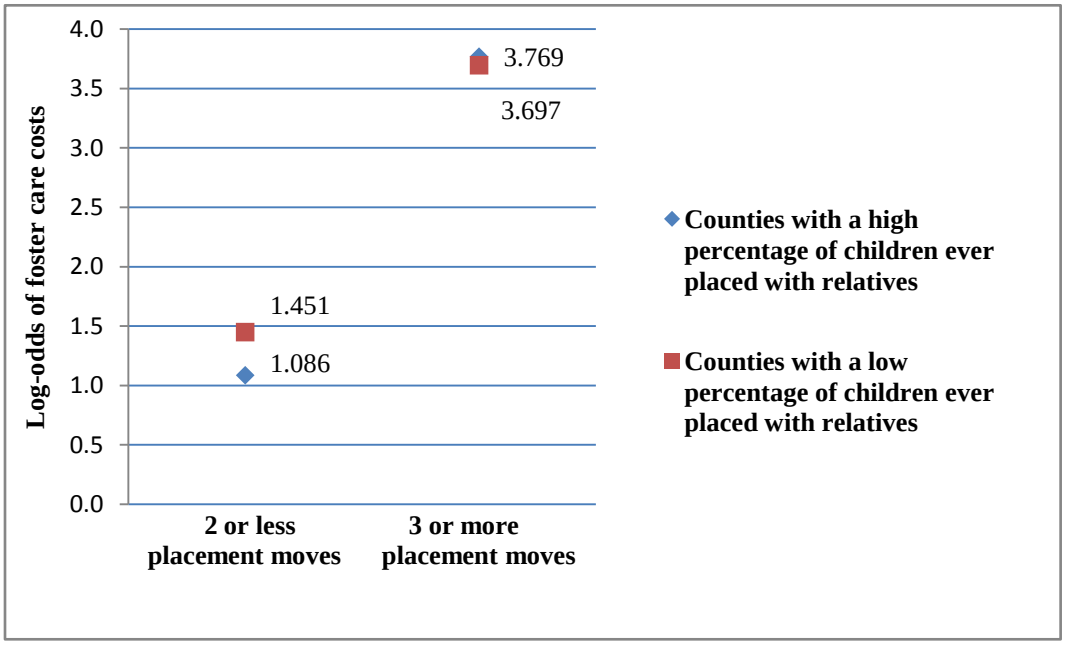


Figure 4. HGLM cross-level interaction between county percentage of children ever placed with relatives and child's number of placement moves

Hierarchical Linear Models (HLM)

I next ran a model that included only the children in the study sample who had foster care costs (n=23,519). With a log-transformed continuous dependent variable,

namely, log costs for out-of-home care, I first ran an unconditional random intercept null model (i.e., no independent variables) to examine what portion of the total variance occurs between counties.

Unconditional model. To determine the amount of between-county variance in log care costs, the ICC was calculated from the variance components, that is, 0.070 / (0.070 + 1.710) = 0.039. This ICC indicated that 3.9% of the variance in log costs resided between counties. Although the ICC was relatively small, it was still appropriate to use multilevel analysis, mainly because counties have a hierarchical structure (i.e., foster children are nested within facilities, which are nested within counties). Foster care services and payments are also administered by counties, implying that foster children's experiences and costs may differ depending on the characteristics, policies, and practices of local counties. To assess the variability across counties, I also examined the effects of cross-level interactions as well as the effects of both child-level and county-level variables on log costs.

Main HLM model. Next I ran a main model to better understand variations in log costs, including both individual-level and county-level factors. An additional level-1 predictor, first placement type, was used in addition to the predictors which I used in the preceding HGLM. I also added another level-2 variable, the county percentage of children who did not have foster care costs. And, when I added variables to examine whether the inclusion of additional random effect was needed, I found that the model which contained the child's percentage of duration of non-family placements for random effect was significant in the likelihood ratio test, indicating that this variable's effect on log costs may vary across counties. In other words, some counties may show a weaker or

stronger effect of the child's percentage of duration of non-family placements on foster care costs than other counties. To accommodate the differences between counties of the effect of the child's percentage of duration of non-family placements, I included percentage of duration of non-family placements as a random slope in addition to a random intercept in the multilevel linear model. Table 5 presents the estimated coefficients and other statistics for the main conditional model. Because the dependent variable was transformed into natural logarithmic form, the coefficients cannot be interpreted directly but instead require exponential transformation. The exponential of the coefficients can be interpreted as the proportional change in costs arising from a unit change in the independent variable.

Table 5. The Effects of Child-Level and County-Level Factors on Log of Foster Care Costs (HLM)

Variable			HLM				
			β	SE	95% CI		Exp(β)
Fixed Effects					Lower	Upper	
Intercept			5.468 ***	0.096	5.277	5.658	
County-Level	County Size	Small (Large & Medium = Reference)	-0.037	0.056	-0.148	0.073	0.963
	% with No Foster Care Costs		-0.001	0.003	-0.007	0.006	0.999
	% of Population Age 19 or Less		-0.017	0.012	-0.040	0.005	0.983
	% of Poverty		0.010	0.008	-0.006	0.026	1.010
	% Ever in Non-Family Placement		-0.005	0.003	-0.011	0.002	0.995
	% Ever in a Residential Treatment Facility		0.001	0.003	-0.005	0.007	1.001
	% Ever Placed with Relatives		-0.009 **	0.003	-0.016	-0.002	0.991
	Number of Beds		0.000	0.000	0.000	0.000	1.000
	IV-E Waiver Participation	Yes (No=Reference)	-0.059	0.057	-0.173	0.055	0.943
Child-Level	Gender	Female (Male=Reference)	-0.004	0.015	-0.034	0.026	0.996
	Race/Ethnicity	Black (White=Reference)	0.027	0.019	-0.010	0.064	1.027
		Hispanic & Other	0.011	0.023	-0.034	0.057	1.011
	Age at Entry		0.024 ***	0.002	0.021	0.028	1.025
	Physical/Sexual Abuse Before Foster Care	Yes (No=Reference)	-0.081 ***	0.023	-0.125	-0.037	0.922
	Neglect Before Foster Care	Yes (No=Reference)	-0.062 **	0.020	-0.102	-0.022	0.940
	Disability	Yes (No=Reference)	-0.157 ***	0.026	-0.209	-0.106	0.855
	First Placement Type	Foster Home (Relative=Reference)	0.209 ***	0.028	0.155	0.263	1.232
		Group Home –Residential	0.277 ***	0.043	0.194	0.361	1.319
		Group Home – Treatment	0.119	0.071	-0.019	0.258	1.127
		Shelter	0.328 ***	0.048	0.235	0.421	1.388

Child-Level (continued)		All Others	0.220 ***	0.031	0.158	0.281	1.246
	Number of Placement Moves	3 or more Placement Moves (2 or less=Reference)	0.252 ***	0.017	0.218	0.285	1.286
	% of Duration of Non-Family Placements		0.016 ***	0.001	0.015	0.018	1.016
	Exit Reason	Guardianship (Reunification=Reference)	-0.283 ***	0.028	-0.337	-0.229	0.753
		Adoption	0.524 ***	0.021	0.483	0.566	1.689
		Custody	-0.119 ***	0.028	-0.174	-0.064	0.888
		Emancipation	0.154 ***	0.034	0.088	0.221	1.167
		All Others	0.324 ***	0.030	0.266	0.383	1.383
Random Effects (Variance Components)							
level-2 residual			0.041 ***				
level-1 residual			1.323 ***				
% of Duration of Non-Family Placements			0.000 ***				
Model Fit Statistics							
-2 Res Log Likelihood			73566.10				
AIC			73630.10				
BIC			73713.50				

SE = Standard error.
*p < .05. **p < .01. ***p < .001.

Child-level predictors. To address Research Question 1, level-1 predictors included in the HGLM were also employed in the HLM. Regarding the association between level-1 predictors and log costs, several variables were significant at the .05 level. Child age at entry had a positive impact on log costs. Specifically, the *exp*(β) of child age at entry was 1.025, indicating that other things being equal, each unit increase in child age at entry increased the average monthly costs by 2.5% (exp(β) = 1.025, $p < .001$). The costs for children with disabilities were 14.5% lower than for children without disabilities (exp(β) = 0.855, $p < .001$). The costs for children who were physically and/or sexually abused before entering care were 7.8% lower compared to foster children who did not experience abuse (exp(β) = 0.922, $p < .001$). Similarly the costs for children who experienced neglect before entering care were 6.0% lower than for foster children who did not experience neglect (exp(β) = 0.940, $p < .01$). Gender and race/ethnicity did not have a significant impact on log costs in the HLM model.

Most foster care experience-related predictors had significant effects on log costs, after controlling for other variables. First placement type affected the quantity of foster care costs. The costs for children placed in foster homes were 23.2% higher than for those placed in relatives' homes (exp(β) = 1.232, $p < .001$). The costs for children placed in residential group homes were 31.9% higher than for children placed with relatives (exp(β) = 1.319, $p < .001$). Children placed in treatment group homes did not have significantly different costs, compared to those placed with relatives. The costs for children placed in shelters were 38.8% higher than for children placed with relatives (exp(β) = 1.388, $p < .001$). The costs for children who had three or more placement moves were 28.6% higher, compared to costs for children who experienced two or less

moves (exp(β) = 1.286, $p < .001$). In regard to the percentage of duration of non-family living arrangements in foster care, *exp*(β) was 1.016, indicating that every percentage point increase in duration of non-family placements among total stays in foster care increased the average foster care costs by 1.6% (exp(β) =1.016, $p < .001$).

In terms of reason for exit from foster care, the costs for children who exited care for guardianship with relatives or court-approved caretakers were 24.7% lower than for children reunified with parents or primary caretakers (exp(β) = 0.753, $p < .001$). The costs for children who exited for adoption were 68.9% higher than for reunified children (exp(β) = 1.689, $p < .001$). The costs for children who exited for custody with non-removal parents, relatives, or court-approved caretakers were 11.2% lower than for reunified children (exp(β) = 0.888, $p < .001$). The costs for children who stayed in care until emancipation were 16.7% higher, compared to reunified children (exp(β) = 1.167, $p < .001$).

County-level predictors. To address Research Question 2, level-2 predictors included in the HGLM were also employed in the HLM. In addition, the county's percentage of children with no foster care costs was included in the model. Only one county-level predictor was statistically significant in the main HLM model: percentage of children ever placed with relatives. In particular, for each one-unit increase in the county's percentage of children who were ever placed with relatives, foster care costs decreased by 0.9% (exp(β) = 0.991, $p < .01$). Other county-level predictors did not have a significant influence on log costs, after controlling for other variables.

Main HLM with cross-level interaction model. To assess Research Question 3, that is, whether the effects of child-level predictors on foster care costs varied depending

on county-level variables, I added cross-level interaction terms, keeping all other predictors, including the random variable, in the main model. First, each cross-level interaction was tested one at a time, that is, the model included all main-effect variables plus the addition of one cross-level interaction. After individually testing each cross-level interaction with the main effects, I found two interactions between level-2 and level-1 predictors that were significant at the 0.5 level. First, the effect of the child's number of placement moves on foster care costs differed depending on the county's percentage of children ever placed with relatives ($\exp(\beta) = 1.016$, $p < .001$). And, county size also moderated the effect of child age at entry on foster care costs ($\exp(\beta) = 1.010$, $p < .05$).

In the final model, which includes all predictors plus two interactions, two interactions, as well as all of the main effects of child- and county-level predictors, were still significant with almost identical estimates.[13] Table 6 presents the results from two cross-level interactions as well as the main effects in the HLM model.

[13] As conducted in HGLM, the likelihood ratio test (also known as deviance test) was also performed in HLM to evaluate the goodness of fit of the final model to the data, using -2 log-likelihood values and the difference in degrees of freedom between models. Chi-square statistics showed that there were significant deviance differences, which indicated that the inclusion of interaction terms improved the models.

Table 6. HLM with 2 Cross-Level Interactions

Variable			HLM with 2 Cross-Level Interactions				
			β	SE	95% CI		Exp(β)
Fixed Effects					Lower	Upper	
Intercept			5.475 ***	0.095	5.287	5.663	
County-Level	County Size	Small (Large & Medium = Reference)	-0.053	0.055	-0.162	0.056	0.948
	% with No Foster Care Costs		-0.001	0.003	-0.007	0.005	0.999
	% of Population Age 19 or Less		-0.021	0.011	-0.043	0.002	0.979
	% of Poverty		0.009	0.008	-0.007	0.025	1.009
	% Ever in Non-Family Placement		-0.004	0.003	-0.011	0.002	0.996
	% Ever in a Residential Treatment Facility		0.001	0.003	-0.005	0.007	1.001
	% Ever Placed with Relatives		-0.008 *	0.003	-0.015	-0.002	0.992
	Number of Beds		0.000	0.000	0.000	0.000	1.000
	IV-E Waiver Participation	Yes (No=Reference)	-0.049	0.056	-0.162	0.063	0.952
Child-Level	Gender	Female (Male=Reference)	-0.005	0.015	-0.035	0.025	0.995
	Race/Ethnicity	Black (White=Reference)	0.025	0.019	-0.012	0.062	1.025
		Hispanic & Other	0.008	0.023	-0.037	0.054	1.008
	Age at Entry		0.024 ***	0.002	0.021	0.028	1.025
	Physical/Sexual Abuse Before Foster Care	Yes (No=Reference)	-0.080 ***	0.023	-0.125	-0.036	0.923
	Neglect Before Foster Care	Yes (No=Reference)	-0.062 **	0.020	-0.101	-0.022	0.940
	Disability	Yes (No=Reference)	-0.156 ***	0.026	-0.207	-0.105	0.856
	First Placement Type	Foster Home (Relative=Reference)	0.212 ***	0.027	0.158	0.266	1.236
		Group Home –Residential	0.281 ***	0.043	0.197	0.364	1.324
		Group Home – Treatment	0.124	0.071	-0.014	0.263	1.132

Child-Level (continued)		Shelter	0.332 ***	0.048	0.239	0.426	1.394
		All Others	0.222 ***	0.031	0.161	0.284	1.249
	Number of Placement Moves	3 or more Placement Moves (2 or less=Reference)	0.257 ***	0.017	0.223	0.291	1.293
	% of Duration of Non-Family Placements		0.016 ***	0.001	0.015	0.017	1.016
	Exit Reason	Guardianship (Reunification=Reference)	-0.285 ***	0.027	-0.339	-0.231	0.752
		Adoption	0.524 ***	0.021	0.482	0.565	1.688
		Custody	-0.122 ***	0.028	-0.177	-0.067	0.885
		Emancipation	0.157 ***	0.034	0.090	0.223	1.170
		All Others	0.325 ***	0.030	0.267	0.383	1.384
Interaction (Cross-Level)	County % Ever Placed with Relatives *Child's Number of Placement Moves		0.016 ***	0.002	0.012	0.021	1.016
	County Size*Child's Age at Entry		0.010 *	0.004	0.002	0.017	1.010
Random Effects (Variance Components)							
level-2 residual			0.041 ***				
level-1 residual			-0.000 ***				
% of Duration of Non-Family Placements			0.000 ***				
Model Fit Statistics							
-2 Res Log Likelihood			73511.30				
AIC			73581.30				
BIC			73672.50				

SE = Standard error.
*$p < .05$. **$p < .01$. ***$p < .001$.

Follow-up analyses were conducted to examine these significant cross-level interactions in detail. Although there was a significant and positive association between average log foster care costs and number of placement moves in all counties, county percentage of children ever placed with relatives differentiated the effect of the child's number of placement moves on log costs, as shown in Figure 5. In particular, in counties with a high percentage of children ever placed with relatives, the effect of number of placement moves on log costs was stronger than for the counties with a low percentage of relative placements (exp(β) = 1.016, $p < .001$).

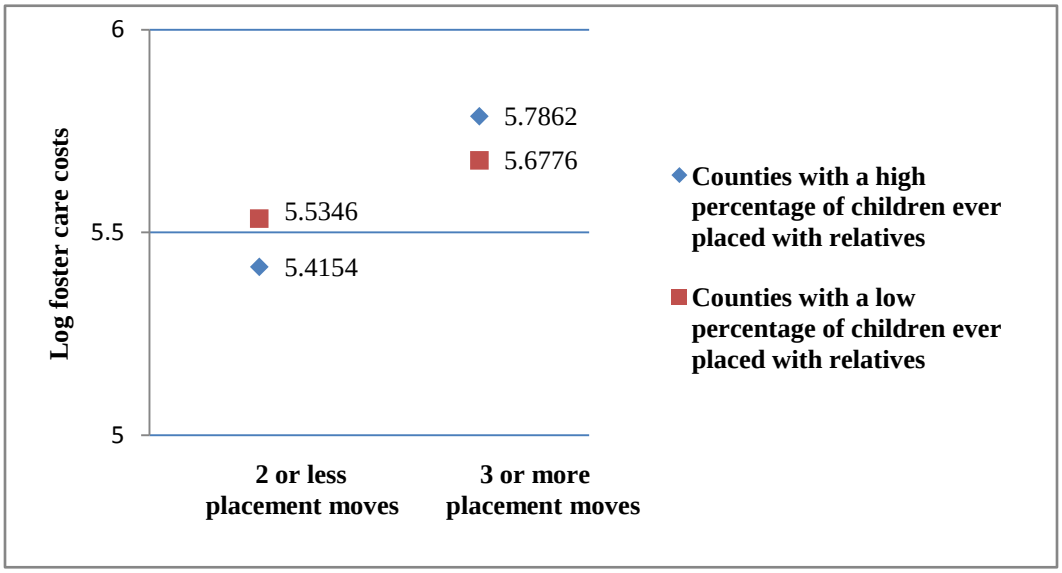


Figure 5. HLM cross-level interaction between county percentage of children ever placed with relatives and child's number of placement moves

In terms of interaction between county size and child age at entry, log foster care costs generally increased as child age at entry increased. However, a significant cross-level interaction indicated that in small counties, as child age at entry increased, the increase in log foster care costs was slightly steeper than the trend line for large and medium counties (exp(β)=1.010, $p < .05$). This regression is shown in Figure 6.

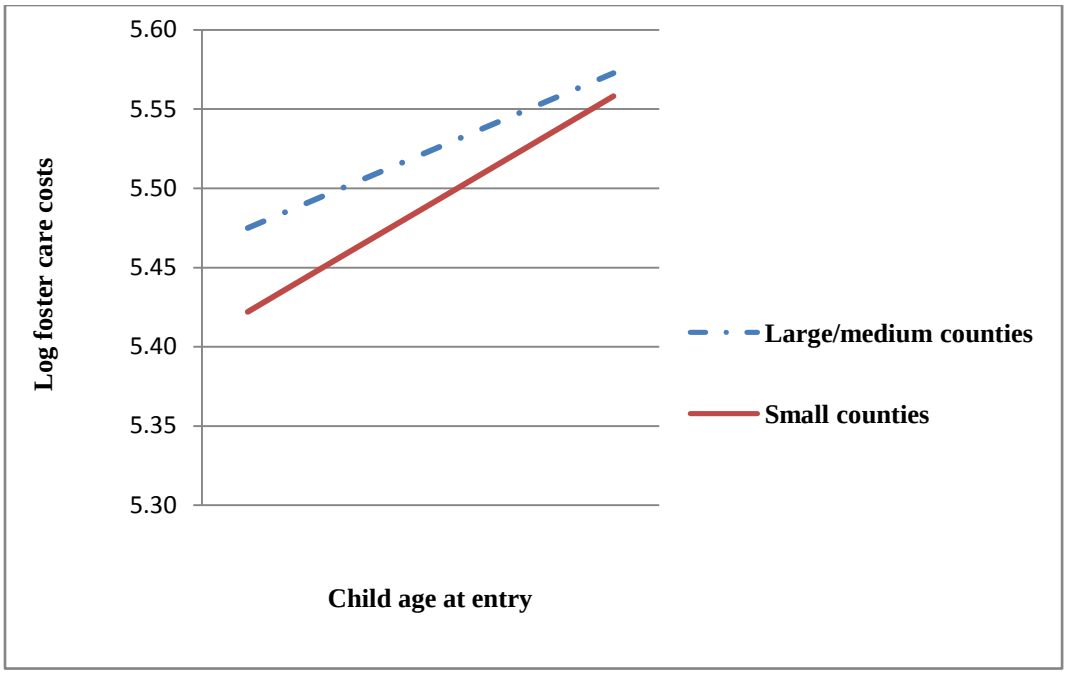
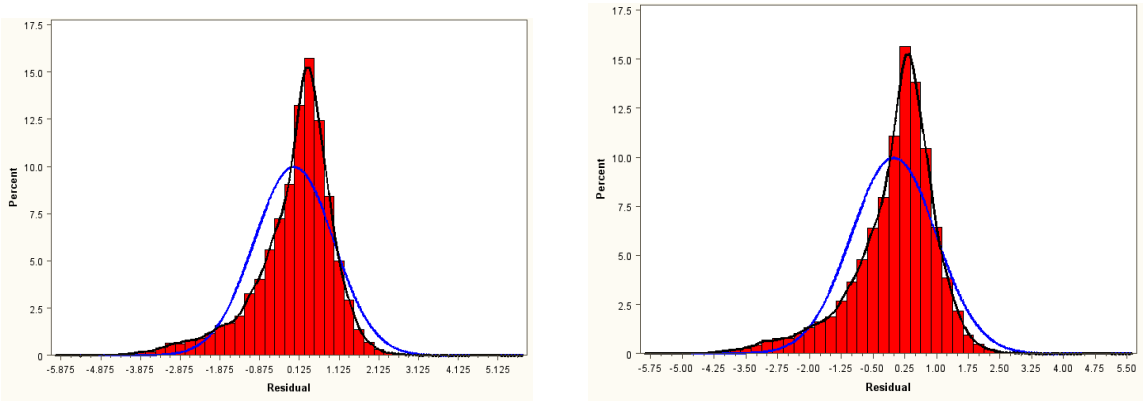


Figure 6. HLM cross-level interaction between county size and child age at entry

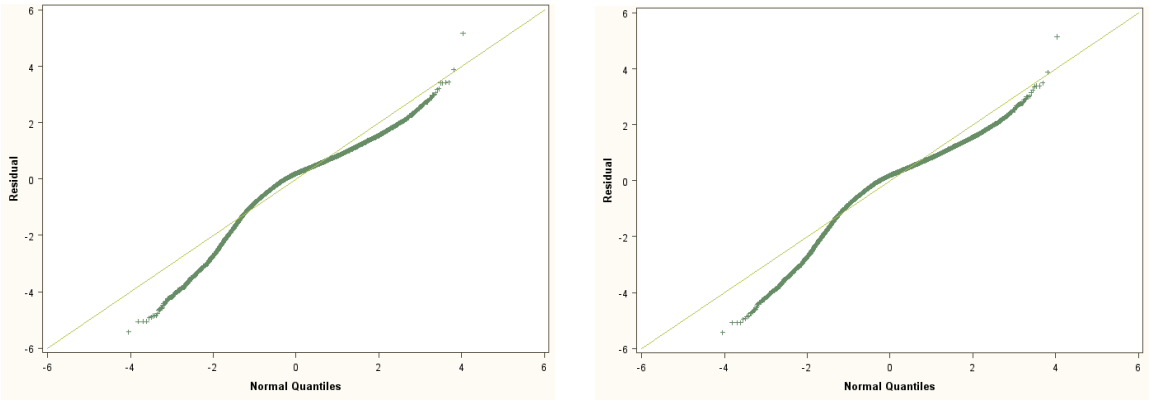
Model diagnostics. Multilevel analysis assumes a normal or multivariate normal distribution of residuals at each level with a mean of zero and constant variance (Snijders & Bosker, 1999). To test for possible violations of HLM assumptions, I conducted residual analyses for both the main HLM and main HLM with cross-level interaction models. First, I checked individual-level (level-1) residuals in the main model and the interaction model. In each histogram in Figure 7, the bars represent the frequency of the estimated residuals, the blue curve represents the normal distribution defined by the sample mean and standard deviation, and the black curve represents the sample-based kernel density estimate of the distribution. All aspects of these histograms suggest that the normality assumption of the level-1 errors was roughly met with the sample data. This is further augmented with a Quantile-Quantile (Q-Q) plot (see Figure 8). Under normality, the ideal Q-Q plot would approximate a 45-degree line. Although logarithmic transformation for the sample data did not completely correct for non-normal distribution

or non-homoskedastic error term due to some deviation from this linear pattern at the extreme positive and negative values, in general the Q-Q plot reflects that the non-normal distribution or heteroskedasticity problem does not appear as severe as it would without logarithmic transformation.



Main HLM HLM + interactions

Figure 7. Histograms of Level-1 residuals

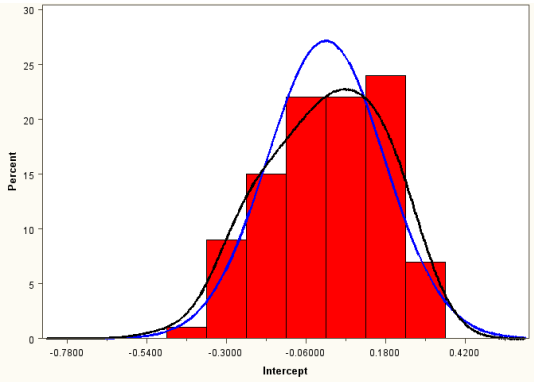


Main HLM HLM + interactions

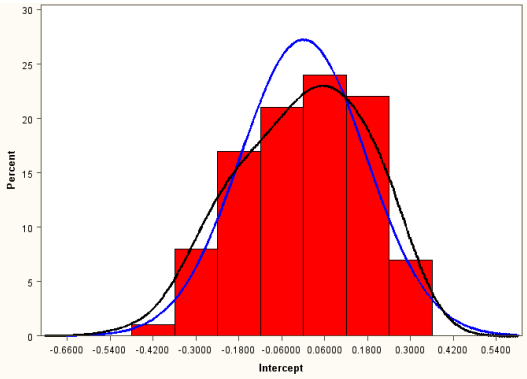
Figure 8. Q-Q plots of Level-1 residuals

Next, I examined the level-2 random effects to examine whether my HLM models met the normality assumptions for multilevel linear models. The kernel density closely corresponds to the normal curve, suggesting that the sample estimates followed an

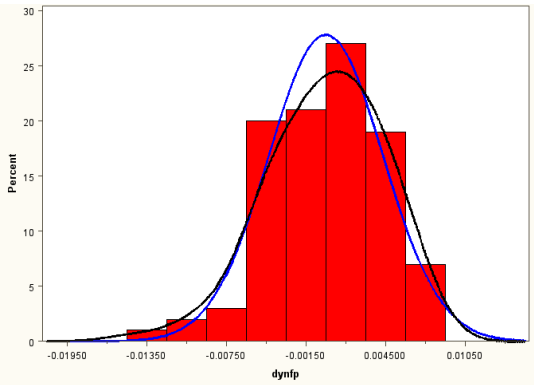
approximately normal distribution, although slightly skewed (see Figure 9). Under normality, we would expect the random intercepts to fall on a 45-degree line; this is mostly supported in the Q-Q plot below with the exception of some stray observations in both tails of the distribution. In regard to another random effect, that of percentage of duration of non-family placements, the random slopes appear to be symmetrically and near-normally distributed, although slightly skewed (see Figure 10). In sum, both the histograms and Q-Q plots for each of the two random effects reflect that these appear to be roughly following a normal distribution. Residuals diagnostics for the final multilevel model show acceptable properties.



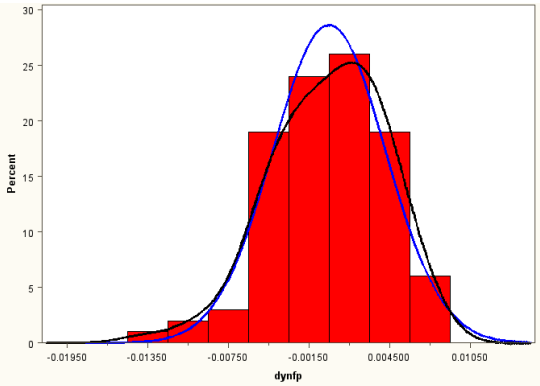
Main HLM: Random Intercept



HLM + interactions: Random Intercept

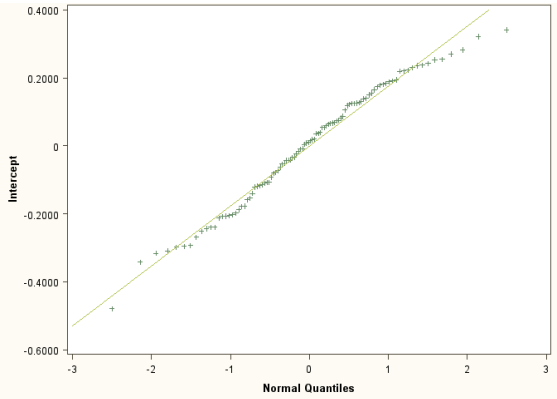


Main HLM: % of duration of non-family placements

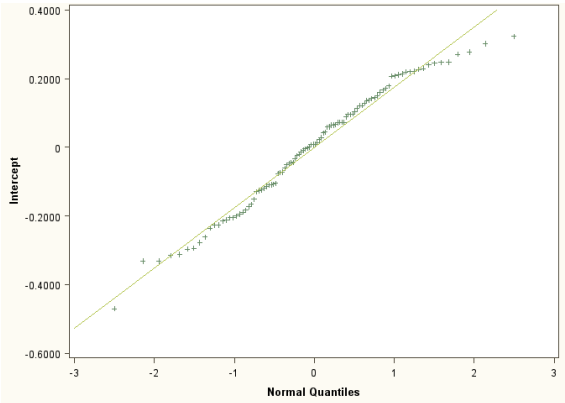


HLM + interactions: % of duration of non-family placements

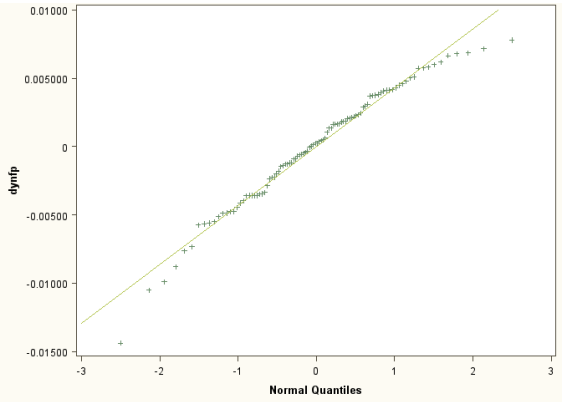
Figure 9. Histograms of Level-2 random effects



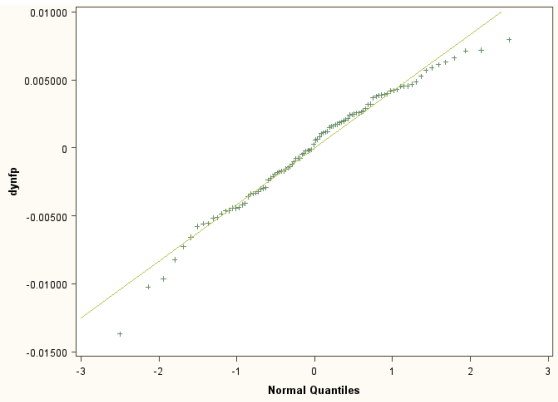
Main HLM: Random Intercept



HLM + interactions: Random Intercept



Main HLM: % of duration of non-family placements



HLM + interactions: % of duration of non-family placements

Figure 10. Q-Q plots of Level-2 random effects

CHAPTER 6

DISCUSSION AND CONCLUSION

Review of Findings

This study used a multilevel analytical approach to assess how individual costs for children in out-of-home care vary depending on child-level factors (e.g., the child's demographic characteristics, reason for placement in foster care, foster care experiences, reason for exit from foster care), county-level factors (e.g., county demographic characteristics, local agency performance), and cross-level interactions between child- and county-level predictors. The study utilized administrative data from the North Carolina Division of Social Services (NC-DSS) and the U.S. Census Bureau. Several child- and county-level characteristics were found to be associated with the likelihood and/or amount of foster care costs, and cross-level interactions were also observed.

Child-level predictors. As predicted in Hypotheses 1-1 though 1-4, some demographic characteristics affected the likelihood of foster children having foster care costs and the quantity of those costs. In particular, foster children who had disabilities were more likely to have costs than children without disabilities. Quantity of costs, however, was negatively associated with the presence of disability. That is, the average monthly costs for children who had disabilities were lower than for children without disabilities. Average monthly costs are calculated by dividing total costs by length of stay; therefore, the lower average monthly costs experienced by children with disabilities could be due to lower costs overall, longer lengths of stay, or a combination of the two.

Previous research has indicated length of stay may be affected by disability; Becker and her colleagues (2007) have suggested that children with physical and mental disabilities or behavioral problems stay longer in out-of-home care before permanency, as have Glisson and colleagues (2000). Or, a foster child may receive other services and payments such as Medicaid, Supplemental Security Income (SSI), and Social Security disability in addition to foster care-related payments. Analysis of Medicaid costs for children in foster care is outside the scope of the current study as are benefits provided through SSI or Social Security.

Race and ethnicity affected the likelihood of foster care costs, but only for children of Hispanic or other racial/ethnic origin. The likelihood of costs was no different for non-Hispanic African-American children than for non-Hispanic White children, but children of Hispanic and other origins were significantly more likely than non-Hispanic White children to have costs. Race and ethnicity did not affect the amount of costs, however. These findings suggest that Latino children may be more likely than White children to be placed in a foster home or other non-family living arrangement rather than with relatives.

Child age at entry had a negative effect on the likelihood of foster care costs. In other words, the older children were when they entered foster care, the less likely they were to have foster care costs. This trend implies that older children may be more likely than younger children to be placed with unlicensed relatives, who are not eligible to receive foster care payments. Among children who did have costs, however, child age at entry was positively associated with an increase in average monthly costs. That is, older children who had costs tended to have higher costs than younger children who had costs.

This may be partially due to the fact that standard board rates for foster care payments generally increase with the age of the child.

Reason for placement in out-of-home care was also associated with foster care costs. While children who experienced physical and/or sexual abuse before entering care were more likely to have costs than foster children without abuse, children who experienced neglect were less likely to have costs than foster children without neglect. These findings suggest that abused children may be more often placed in paid living arrangements, while neglected children may be more often placed with relatives. On the other hand, among children with costs, the costs for children who were physically and/or sexually abused before entering foster care were lower, compared to costs for foster children who did not experience abuse. Similarly, the costs for children who had experienced neglect before entering foster care were lower than for children who did not experience neglect. These findings suggest that abused and/or neglected children are more likely to be placed in a family-type setting rather than in more costly placements. They also suggest that children who have suffered abuse or neglect may stay longer in out-of-home care than children with other reasons for placement.

All foster care experience-related predictors had a significant influence on the likelihood of children having foster care costs. Most initial placement types were significantly positively associated with the amount of foster care costs. The costs for children who were initially placed in foster homes, residential group homes or shelters were higher than for children initially placed with relatives. While these results are not surprising given that unlicensed relative placements in North Carolina are not paid, they suggest that children who are initially placed with relatives may continue to stay with

relatives throughout the duration of their stay in foster care. Placement stability also had a significant influence on the likelihood of foster care costs. Children who moved placements three or more times were more likely to have costs than children who experienced two or less placement moves. The costs for children who experienced more frequent placement moves were also higher. These findings suggest that the children who experienced frequent placement moves may have more chance to be placed in paid living arrangements and these multiple placement moves led to an increase of costs in out-of-home care.

The child's percentage of duration of non-family living arrangements in foster care also influenced both the likelihood and the amount of foster care costs. An increase in this percentage was significantly related to an increase in the likelihood of costs. Also, for children who had costs, an increase in this percentage led to higher costs. These findings are very understandable in that when foster children are placed in non-family settings such as group homes rather than in foster homes or with relatives, they are very likely to have higher foster care costs.

Reason for exit from foster care was also related to both the likelihood and amount of foster care costs. For example, children who exited foster care for guardianship with relatives or court-approved caretakers were less likely to have costs than children who were reunified with parents or primary caretakers. Similarly, children who exited foster care for custody with non-removal parents, relatives, or court-approved caretakers were less likely than reunified children to have costs. Children who exited for adoption, however, were more likely than reunified children to have costs, as were children who stayed in care until emancipation. These findings may be mostly related to

relative placement. That is, children who exited foster care for guardianship or custody were very likely to be placed in a non-paid living arrangement such as an unlicensed relative placement. On the other hand, children who exited for adoption or emancipation were more likely to be placed in paid living arrangements rather than with relatives. These findings can be connected with the relationship of exit reason and the amount of monthly foster care costs. That is, the costs for children who exited foster care for guardianship or custody were lower, compared to costs for children reunified with parents or primary caretakers. The costs for children who exited for adoption or stayed in care until emancipation, however, were higher than for reunified children. Another reason for this trend may be that children who are ultimately adopted or emancipated are likely to be placed in a paid living arrangement, whereas children who exit for guardianship or custody are likely to be placed in non-paid relative placements.

County-level predictors. As predicted in Hypotheses 2-1 and 2-2, some factors related to county demographic characteristics and local agency performance were associated with the likelihood and/or amount of foster care costs. Two county-level predictors were statistically significant in their association with the likelihood of costs. First, county size significantly affected the likelihood of costs. Children who lived in small counties were less likely than children living in large and medium counties to have foster care costs. This finding suggests that agencies in small counties are more likely to place foster children in non-paid living arrangements such as placement with relatives, compared to agencies in large and medium counties. This difference may be related to variations in service availability in large/medium vs. small counties and/or financial constraints of local agencies.

Second, the county percentage of children ever placed with relatives had a negative effect on the likelihood of foster care costs. This suggests that the children living in counties where local agencies preferred relative placements were less likely to have costs, compared to those in counties where agencies used other various types of placements over relative placements. It may be also associated with a local agency's capacity for living arrangements. If there are a high number of living arrangements, such as congregate care facilities, available in a county, this would enable an agency to be more flexible in its placement practices, whereas a county with a lack of placement settings may be forced to rely on relative placements, regardless of a child's needs.

In regard to the relationship between county-level factors and amount of costs, the county percentage of children ever placed with relatives was negatively associated with average monthly foster care costs. In other words, costs for children who lived in counties where local agencies tend to use relative placements were lower. When a local agency prefers non-paid relative placements, it is not surprising that foster children in that agency's jurisdiction are more likely to be placed with relatives rather than in other types of placements, and this practice would consequently lead to lower foster care costs.

Cross-level interactions. As predicted in Hypothesis 3-1, the effects of several child-level factors on foster care costs varied depending on county-level factors, creating cross-level interactions. Three such interactions appeared to have a significant effect on the likelihood of foster care costs. First, the effect of the child's number of placement moves on the likelihood of costs varied depending on the size of the county where the child lived. County size also affected the relationship between the child's percentage of duration of non-family living arrangements in foster care and the likelihood of costs. Also,

the county percentage of children ever placed with relatives also moderated the influence of the child's number of placement moves on the likelihood of costs.

First, in regard to the interaction between child placement moves and county size, whereas the number of placement moves significantly affected the likelihood of costs in all counties, county size differentiated the magnitude of this effect. While children who had two or less placement moves had similar likelihoods of costs regardless of county size, children who had three or more placement moves showed a higher likelihood of costs if they lived in large or medium counties than did children from small counties who experienced three or more placement moves. This finding suggests that frequent placement moves in large and medium counties may have led to placements in paid living arrangements, whereas foster children in small counties who moved frequently were likely to move between non-paid living arrangements such as relative placements. It may also indicate that local agencies in small counties rely on relative placements rather than paid living arrangements, because these counties have a limited number and variety of foster care services and resources available to them, compared to large and medium counties. Small counties may also face more financial constraints than large and medium counties.

Second, the likelihood of foster care costs generally increased as the child's percentage of duration of non-family placements increased. However, a significant cross-level interaction between the child's percentage of duration of non-family placements and county size indicated that the effect of the percentage of duration of non-family placements had a greater effect on the likelihood of costs for children in small counties, compared those in large and medium counties. In other words, how local agencies

implement child welfare practice may have a stronger influence on the likelihood of costs for children who live in small counties, compared to children in large and medium counties. The finding suggests that intra-county variations in foster children's experiences and costs were larger in small counties than large and medium counties.

Third, there was a significant interaction between the county percentage of children ever placed with relatives and the child's number of placement moves. For children who experienced three or more placement moves, the county percentage of children ever placed with relatives had a greater effect on the likelihood of costs than for children who had two or less placement moves. In other words, for children living in counties with a high percentage of relative placements, their frequency of placement moves had a greater effect on their likelihood of costs, compared to children living in counties with a low percentage of relative placements. This finding suggests that for foster children who live in a county with a limited availability of living arrangements, placement moves are more likely to lead to paid placements rather than relative placements.

While the three cross-level interactions just discussed were significant in their effect on the likelihood of foster care costs, there were two other cross-level interactions that significantly affected the amount of costs. First, the effect of the child's number of placement moves on the amount of costs differed depending on county percentage of children ever placed with relatives. Second, county size moderated the impact of child age at entry on the amount of costs.

First, although there was a significant and positive association between number of placement moves and amount of costs in all counties, the effect of the number of

placement moves varied by the county's percentage of children ever placed with relatives. For children in counties with a high percentage of children ever placed with relatives, their number of placement moves had a stronger influence on their amount of costs, compared to children in counties with a low percentage of children with relative placements. This finding can be also connected with the third cross-level interaction of HGLM. That is, this finding could be interpreted to mean that in counties with a high percentage of relative placements, children who frequently moved placements were likely to be placed in more paid or costly living arrangements. On the other hand, given that average monthly costs vary in inverse proportion to length of stay, it could be that children who lived in counties with a high percentage of relative placements and who frequently moved placements may have shorter lengths of stay than children who frequently moved placements but lived in counties with a lower percentage of relative placements.

Second, child age at entry was positively associated with amount of foster care costs in all counties. In other words, costs generally increased as child age at entry increased. A significant cross-level interaction, however, demonstrated that in small counties, as child age at entry increased, the increase in foster care costs was slightly steeper, compared to the trend line in large and medium counties. This finding indicates that the influence of age at entry on average monthly costs in out-of-home care was stronger in small counties, compared to large and medium counties. This variation may be due to a difference in length of stay between small counties and large and medium counties. That is, age at entry may be more related to difference in the length of stay for children in small counties, compared to large and medium counties.

In sum, these significant cross-level interactions on both the likelihood and the amount of foster care costs suggest that funding constraints and availability of services and living arrangements in counties, as well as administrative processes such as a local agency's preference for specific practices, moderated the effects of foster children's experiences on the costs of out-of-home care. In particular, placement in non-family living arrangements may vary depending on county size (small vs. large/medium) and urbanicity. Small counties and counties in rural areas may tend to place foster children in less restrictive living arrangements, including relative placements, rather than in more costly placements such as group care facilities.

Implications

Policy and practice. In child welfare services, it is hoped that all children in out-of-home care are able to achieve positive outcomes including safety, permanency, and well-being. In reality, however, variability among children's individual characteristics and differences among counties lead to differences in foster care services and costs and, consequently, different experiences in foster care, which lead to different outcomes. Specifically, child-level demographic characteristics such as age, race/ethnicity, disability, and reason for placement were found to be associated with differences in children's costs in out-of-home care. Overall, age at entry was found to be negatively associated with the likelihood of foster care costs. However, among children who had costs, children who entered care at older ages had higher costs. These findings not only suggest that older children have higher standard board rates and/or shorter lengths of stay in foster care, but also that older children may be more often placed with unlicensed relatives. These findings can be interpreted in two ways in terms of policy and practice. If relative

placement is used in the interest of helping children remain in a safe and stable environment and bring about a faster time to reunification, it would be considered as good practice. However, if a local agency chooses relative placement over other types of placement mainly for cost savings without full consideration for children's outcomes, then that agency's policy and practices need to be revised to better balance its mission to achieve better outcomes for children with its obligation to maintain the financial stability of the agency.

Children with a disability were found to be more likely to have foster care costs, but their costs were lower. This finding implies that although disabled children may qualify for additional payments from other welfare programs and services, local agencies may be providing insufficient subsidies in foster care, and/or perhaps disabled children stay longer in out-of-home care. At the same time, many of the costs of services for these children—such as medical and therapeutic care—could be covered by other sources, such as Medicaid. The provision of these services is not related to maintenance costs. Indeed, the provision of therapeutic care is treated as an administrative cost instead of a maintenance cost. Policymakers and practitioners need to assess whether services currently available for children with disabilities actually meet those children's needs, and, in cooperation with other social welfare services and programs, take steps to eliminate any deficiencies and streamline services. Policymakers and practitioners may also wish to take a look at the issue of disproportionality of children in foster care in light of the findings of this study. Children of Hispanic and other origins were more likely than White children to have foster care costs. There are likely a number of reasons for this. One reason is that there may be a dearth of kinship care opportunities for these children. As a

result, they are more likely to be placed in licensed care. There also may be issues related to the need for cultural competency training in dealing with Hispanic and Latino children for social workers. Cultural competency training could help social workers better understand minority children's different experiences before entering foster care and in out-of-home care, which in turn can help to ensure that all subpopulations of children achieve positive outcomes.[14]

This study also highlighted the importance of several factors regarding foster care experiences that are related to costs in out-of-home care. Specifically, identifying initial placement type in association with foster care costs is very important, because it may help predict how local agency policies and practices are implemented over the duration of the child's stay in out-of-home care as well as during initial placements. For example, the study found that children who are initially placed with relatives are very likely to stay in relative placements and consequently are less likely to have foster care costs, compared to children initially placed in other settings. Placement stability is also an important indicator for policymakers and social workers to pay attention to, because multiple placement moves may lead to increased foster care costs, and placement instability may be related to longer stays in out-of-home care (Barbell & Freundlich, 2001; Hochman, Hochman, & Miller, 2004; Webster, Barth, & Needell, 2000), likely resulting in increased costs. Understanding the association between agencies' use of non-family living arrangements and foster care costs can help policymakers and practitioners, especially when they try to balance efforts to promote good practice and achieve better outcomes for foster children, and to simultaneously meet organizational policies and goals.

[14] Prior research suggested that disparate practice including placement decisions can be improved when caseworkers have higher case skills with cultural awareness (Baumann, Dalgleish, Fluke, & Kern, 2011).

The importance of reason for exit from foster care was also highlighted. Costs—both the likelihood and amount—were significantly associated with variations in reason for exit from foster care. Specifically, children who exited foster care for guardianship or custody had a lower likelihood of costs and lower cost amounts, compared to reunified children. One reason for this is that the guardian may be a relative and that the child was placed with that relative in an unpaid kinship setting prior to exit. Children who exited for adoption or emancipation, in contrast, were more likely than reunified children to have costs, and their costs were higher. Children who exit care through emancipation may spend a large portion of their time in care in congregate care, which has a higher cost than a family foster home. Again, these findings imply that children who exited for guardianship or custody were likely to be placed in unlicensed kinship care, while children who were ultimately adopted or emancipated were likely to be placed in non-family placements such as group homes. These findings can help policymakers and practitioners to assess whether they are making the best use of resources to achieve permanency and also to develop strategies to produce better outcomes for both children and agencies.

The study also focused on the importance of county characteristics and local agency practices that are related to costs for caring for foster children. An emphasis on county-level factors in conjunction with child-level factors provides a more comprehensive understanding of variations of costs for caring for children in out-of-home care. Specifically, county size was found to be associated with foster care costs. Children in small counties are less likely to have foster care costs, compared to children in large and medium counties, because they were more likely to be placed in non-paid relative

placements. County size also moderated the effects of some child-level factors (e.g., number of placement moves, percentage of duration of non-family placements) on the likelihood of costs. The influence of a child's age at entry on the likelihood of costs was also moderated by county size. These findings may help local agencies to better understand how local community characteristics in a broader context may be related to experiences of foster children and variations in costs. Also, these findings may provide evidence for state and local agencies to evaluate how to allocate and manage available resources to meet foster children's needs, and further to develop policies and adapt practices to produce desired outcomes in locations that may be unable to provide efficient and sufficient services to foster children due to limited resources.

Also, local agency use of certain types of placements was found to be related to the likelihood and amount of foster care costs. For example, children who lived in counties where local agencies tend to use relative placements had a lower likelihood of costs and tended to have lower costs. County percentage of children ever placed with relatives also moderated the effect of a child's number of placement moves on the likelihood and the amount of foster care costs. Also, the effect of the child's percentage of duration of non-family placements on the likelihood of foster care costs was greater in small counties, compared to large and medium counties. These variations may depend less on county size per se than on available resources and also agencies' choices of resources based on environmental and organizational context. Thus, the fact that how agencies use particular types of placements is associated with foster care costs and outcomes is an important consideration when policymakers and social workers balance efforts to help foster children have positive outcomes and simultaneously to meet

organizational policies and goals. Particularly, these contextual factors should be included when considering potential reforms to improve child welfare policy and practice.

In sum, the assessment of variations in foster care costs depending on a variety of child and county-level factors can inform child welfare policymakers and practitioners about how they have used resources in their practice for foster children in order to meet children's needs and improve outcomes, and at the same time, to meet organizational policies and goals. State and local child welfare agencies may be able to obtain a deeper understanding of their performance by assessing certain child- and county-level characteristics related to foster care costs, and also by allowing agencies to identify targeted populations or areas needing additional attention or resources for improvement.

Research and methods. Child welfare research has focused on how effectively child welfare service agencies are fulfilling their missions, and how policymakers and practitioners can use evidence-based models to improve the delivery system of child welfare services. Child welfare agencies have been increasingly interested in the costs of caring for the children they serve in order to assess whether their services and programs meet children's needs and improve outcomes and also to meet their given or chosen objectives as much as possible within constrained budgets and resources. Although there has been much cost-related research focused on state- and/or county-level aggregate costs, especially since the IV-E waiver demonstration programs were established, there are currently very few studies which have examined individual costs for children in the child welfare system. A calculation of cost per person is crucial particularly when variations in costs at the individual level are considered in the association with a variety of child- and county-level characteristics.

Previous research has suggested that a study of individual-level foster care costs needs to consider variables regarding foster children's socio-demographic characteristics, previous history, services they received, and outcomes, in order to assess foster care costs (Knapp, 1993, 1995). Using these factors, a researcher may estimate costs in two ways: top-down or bottom-up. The top-down approach consists of starting with the total costs of a service and then estimating the average costs for each child from the total (Allen & Beecham, 1993). The bottom-up approach, in contrast, consists of calculating the total and average costs from the actual unit costs of the service. The bottom-up approach is considered superior particularly in estimating costs at the individual level because it is likely to include more information on elements of the services and, therefore, result in a more accurate calculation of total and average costs. If a cost analysis were to be conducted based on the principles and the methods described above, the study could provide information on the relationship between foster children's various needs, the cost of the services they received in foster care, and their positive or negative outcomes.

Such a study, however, may not be complete without consideration of a comprehensive array of services and case activities in conjunction with a broader context such as county characteristics and local agency performance. In particular, as foster children's experiences, outcomes, and foster care costs may vary depending how local agencies implement practices for the children nested within counties and local agencies, a multilevel analytical approach is needed to precisely examine the association of foster care outcomes and costs with both child and county factors. Although there are a handful of studies that have applied multilevel approaches to the evaluation of child welfare data, where children are nested within local agencies or communities (Brown, 2005; Coulton,

Korbin, & Su, 1999; Drake et al. 2006; Guo & Wells, 2003; Weigensberg, 2009), none of the available research prior to this study examined individual costs of child welfare services and programs, using data and methods to account for the multilevel nature of children nested within counties. This study provides useful contributions to child welfare research in regard to methodology. In particular, this study provides strong evidence of the necessity of using multilevel methods by simultaneously identifying various child- and county-level significant factors and cross-level interactions associated with variations of foster care costs, using longitudinal and clustered data.

Additionally, service costs are generally characterized by a variety of factors that make statistical analysis difficult, such as non-negative measurements, nontrivial proportion of zero costs in the target population, and a positive skewed distribution of the nonzero expenditures among persons using paid services. In particular, a considerable proportion of the children in out-of-home care analyzed in this study—28.7%—appeared not to have any foster care costs, mainly due to their being placed in unlicensed kinship care. Although analytical strategies may vary depending on data and research purposes, the strategies applied in this study can provide information to researchers about how to deal with the complexity of cost data in a contextual framework.

Limitations and Future Research

This study is not without limitations. First, as with other studies that use administrative and secondary data, this study faced challenges associated with measurement. This study relied on a limited number of variables which were available in child welfare administrative data from NC-DSS and secondary data from the U.S. Census Bureau, which cannot capture all aspects of foster children's problems, needs, and

outcomes in detail. For example, additional information about foster children's families of origin and about their caretakers could have provided more insight into variations in foster care costs. In fact, previous research has demonstrated that the number of parents in the home and the number of parent visits during out-of-home care are associated with length of stay in foster care (Glisson et al., 2000; Hess et al., 1992). Foster children's experiences and the costs also vary depending on whether children are in foster care with their siblings. Prior research found that placement with siblings was significantly related to foster children's experiences including placement stability, length of stay in foster care, and permanency outcomes (McMurtry & Lie, 1992; Tam & Ho, 1996; Wulczyn et al., 2003). Given that children's experiences in foster care are significantly associated with foster care costs, it is likely that these family-related variables are also related to variation in foster care costs. If data about these variables had been available, these relationships could have been studied more closely.

As mentioned earlier, availability of resources in a community may also influence service provision and costs. It is also likely that individual staff members both within and across agencies may emphasize some components of programs and services more than others. In addition to those factors that this study considers, any number of unobserved direct and indirect factors (e.g., family functioning, agency staffing, social and environmental context,[15] global recession) related to foster children's needs, experiences, and outcomes may influence the costs for foster children. Thus, it is hoped that future research can consider a wider range of child and family characteristics, as well as environmental and organizational characteristics, in assessing variation in foster care

[15] For example, poverty may affect children's problems, needs, and experiences in foster care. Given that rural poverty is different from urban poverty, a child in smaller county is less likely to face a serious trauma compared to a child in a larger county or metropolitan area.

costs.

Also, this study relied on information on foster care usage and costs for foster children who live in North Carolina. The dynamics of service usage and costs for children in association with various child- and county-level factors vary across states, depending on the child welfare agency's rural/urban status, size, and whether the state has total control of that agency or control is shared between the state and the county. These differences were not considered in the analysis. Thus, a multi-state study is needed to assess whether the findings of this study can be more broadly applied in other states.

This study used only maintenance costs to estimate the costs of out-of-home care. There are many other types of costs, namely, court-related costs, administrative costs, and other service costs including personnel costs and non-personnel administration (e.g., building maintenance, information and communications technology). These additional costs also vary by placement type and reason for exit from foster care and by state and local agencies. Further, maintenance payments for foster children generally are designed to cover room and board only, and thus do not cover all services that foster children receive, such as medical and mental health treatments. For example, if a foster child were hospitalized, the costs would likely be covered by Medicaid or other insurance. In fact, previous research has shown that youth in foster care use a substantial proportion of all Medicaid services (Halfon, Berkowitz, & Klee, 1992; Harman et al., 2000). Thus, to more accurately estimate foster care costs and their relationship with various factors, a full range of costs for this care, as well as those of child welfare services, should be considered in future research.

This study did not fully consider the impact of several reform efforts in recent

years. Agency engagement in alternative response or child welfare reform efforts has been found to be directly associated with foster care outcomes, which may be also related to costs of out-of-home care. For example, research has suggested that the Multiple Response System (MRS) in North Carolina, which allows local agencies to provide tailored services to meet families' complex needs through multiple methods or strategies, may influence permanency outcomes (NC-DHHS, 2010; Weigensberg, 2009). Specifically, MRS guidelines may encourage local agencies to place less severe cases in an assessment track without foster care placement; as a result, only the most severe cases of maltreatment are directed toward out-of-home care. Consequently, children in counties where local agencies engaged in MRS have had longer lengths of stay before achieving permanency. On the other hand, selected counties have participated in reform efforts (e.g., the Families for Kids initiative, the Family to Family initiatives) designed to improve permanency outcomes for foster children, including shorter lengths of stay in out-of-home care (Weigensberg, 2009). Additional research (Pennell, Edwards, & Burford, 2010; Sheets et al., 2009) has found that family group engagement in foster care, such as family team meetings and family group decision-making, facilitates reunification with shorter lengths of stay. This research also found that children whose families were engaged were more likely to be placed in kinship foster care. Thus, an examination of the effects of these programs on foster care costs, and a comparison between participating counties and non-participating counties, should be considered, as well as an evaluation of counties' performance before and after programs were implemented.

Natural logarithmic transformation employed in the HLM analysis of this study is commonly used to shorten the long right tail, lessen heteroscedasticity, and reduce the

influence of outliers by obtaining approximately normal and homoscedastic residuals for costs data which has a positively skewed distribution. However, it does not always eliminate the skewness and heteroscedasticity inherent in cost data with a long tail (Kilian et al., 2002). Furthermore, because log costs cannot be directly interpreted into actual dollar amounts, when trying to estimate costs for prediction purposes, a re-transformation method (e.g., smearing estimate) should be used to transform log costs back to the original scale without bias (Duan, 1983; Liu, Ma, & Johnson, 2008). However, Duan's smearing method cannot be employed in models with random effects such as HLM (Liu, Strawderman, Cowen, & Shih, 2010). As alternatives, recent research suggests generalized linear models (GLM) or HGLM for multilevel data, which are based on Poisson distribution, negative binomial distribution, or gamma distribution (Guo & Bollen, in press; Jones, 2000; Manning, Basu, & Mullahy, 2005). The decision about which distributional assumption in an analytical model is best should be individually tailored according to data and research purpose. Sometimes, a researcher encounters problems on model convergence under a certain distributional assumption. Thus, both theory-driven and data-driven approaches are needed to choose an appropriate model.

Conclusion

To achieve positive outcomes in out-of-home care services, policymakers, practitioners, and researchers have made efforts to develop valid and reliable methodologies to assess the outcomes of children and local agencies. In particular, knowledge of how child- and county-level characteristics are related to foster care costs can be very valuable to child welfare policymakers and practitioners, especially when trying to identify specific areas of policy or practice that could be improved to facilitate

achievement of better outcomes. Such a comprehensive cost analysis for child welfare services and programs requires as complete a listing as possible of information on local agency performance, costs of services, and child outcomes. This information includes not only the characteristics and experiences of the individual child, but also the characteristics of the county and the practices and policies of the local child welfare agency.

It is hoped that this study will have significant implications for child welfare practice and related research. This study tries to answer largely unconsidered questions regarding the relationship between foster children's experiences and their costs at both the micro and macro levels. The ultimate goal of this study is to provide a more detailed picture of service use and costs for foster children. Such a detailed picture will help legislators, program administrators, practitioners, and child welfare experts to reform intervention plans and social work services as well as policies for children in the child welfare system, in order to strengthen states' and counties' performance on the aggregate child welfare outcomes identified as a focus at this time in the public child welfare arena, and, most importantly, improve the experiences and outcomes of foster children.

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